



FRIDAY, AUGUST 9, 1878.

Contributions.

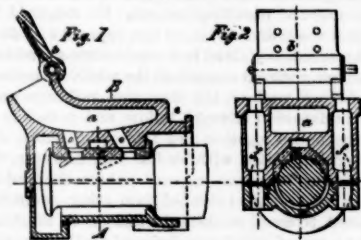
On Car Axle-boxes and Lubricants in Europe.

BY WALTER R. BROWNE.

The English literature on the subject of railway axleboxes is very scanty. In this, as in many other matters of railway construction, the Continental, and especially the German engineers, have done far more than those of England or America for the elucidation of the subject. It is proposed in the present article to do something toward supplying this defect, by giving a series of the best examples both in English and Continental practice, but it is only fair to acknowledge at the outset how much is due to the labors of foreign authors. Railway axle-boxes were some year ago the subject of an elaborate prize disquisition by Herr Heusinger von Waldegg, and have more recently been treated at length in the same writer's valuable "Handbuch für Specielle Eisenbahn-Technik," published in 1873. From this latter work much of the present article has been derived.

Axle-boxes must obviously be classified according to the

makers employ palm oil alone, others add tallow to it, by which, although the cost is increased, a superior quality of grease is produced, of the same consistency as before, and with a smaller actual proportion of fatty matters. A lubricant containing 35 per cent. mixed tallow and palm oil goes as far as one containing 45 per cent. palm oil alone. This has been proved by actual experiment. An axle-box was filled with the best quality of grease, containing 35 per cent. tallow and palm oil mixed, which lasted for a run of 1,200 miles, whereas an axle-box filled with grease of the worst sort, containing 35 per cent. palm oil alone, had to be replenished after a run of only 40 miles. Grease which con-



tained 46 per cent. nearly pure tallow proved to be too solid; the axles were apt to become heated, and the number of miles run was only 800. The best quality, after a few revolutions of the axles, seemed to become softened to the consistency of very thick cream, in which condition it effected a perfect lubrication.

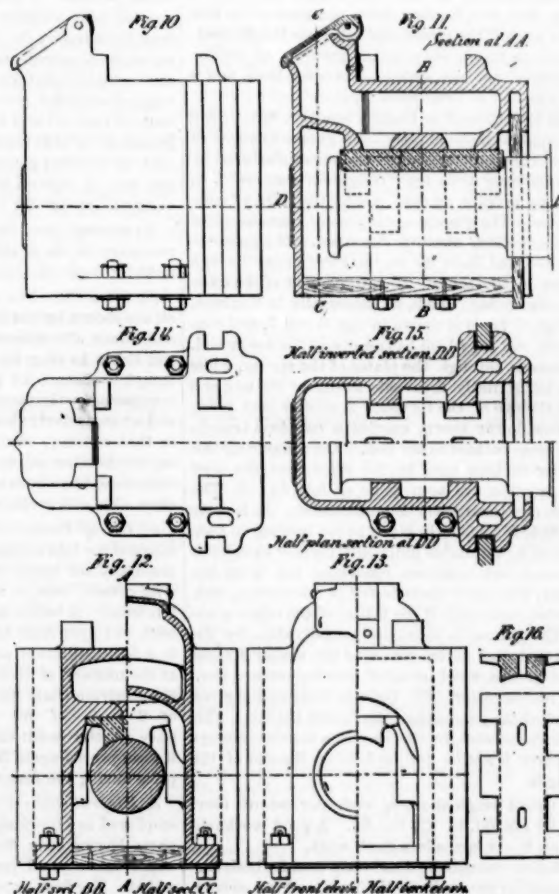
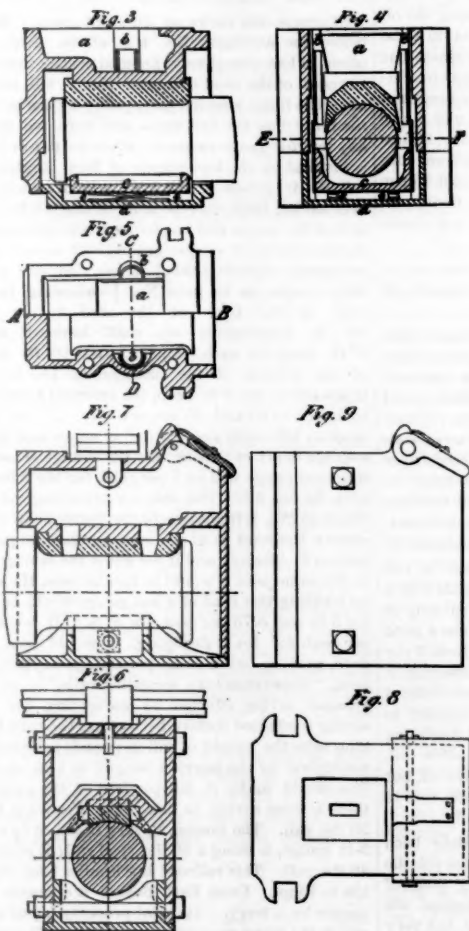
tured according to the following receipt: 72 kilograms of tallow and 36 kilograms of palm oil are melted with 30 litres of water, and into this liquid are gradually poured 18 litres of colza oil, 125 litres of water and 4½ kilograms of soda, which have previously been melted up together in a separate vessel. The whole is kept boiling for 2½ hours, after which it is passed through a sieve to separate the impurities contained in the tallow and oil.

On the German railways, grease has been almost entirely superseded by oil, and is only used in a few cases for ballast trucks, etc., as for instance on the Brunswick Railway, where the composition of the mixture is 100 lbs. of palm oil, 20 lbs. of soda, 140 lbs. of tallow and 140 lbs. of water, making together 400 lbs. of grease; as on the Berg & Mark Railway, where the mixture consists of 180 lbs. of palm oil, 100 lbs. of tallow, 33 lbs. of soda and 300 lbs. of water.

As a comparison with the German practice, we give below the composition of grease as now used on one of the leading English railways:

	Parts.
Tallow	24.6
Palm oil	9.8
Rape oil	1.1
Soda	5.2
Water	59.3
	100.00

On the Austrian State Railway, grease is employed only for the old stock, which is not yet fitted with oil boxes. The grease consists of tallow, with a mixture of olive oil and old grease, recovered from wagons which have been



nature of the lubricant contained in them. We have thus, to start with, three main divisions, as follows:

- (A) Axle-boxes for solid lubricants or grease.
- (B) " " viscous lubricants.
- (C) " " liquid lubricants or oil, which require further subdivision.

As a matter of practice, the question lies between grease and oil, each of which have their strong supporters. We propose to treat the three classes in order, beginning in each case with a description of the lubricant itself, and going on to give illustrations of boxes designed for it; finally to make some remarks on the general question of the best metal to be used for the bearing surface and of the comparative advantages of oil and grease.

Class A. Axle-boxes for solid lubricants, i. e., Grease.

§ 1. SOLID LUBRICANTS.

Grease has been employed as the main lubricant on English railways ever since the year 1834, where it superseded the oil originally used. It was then composed of tallow, oil and sulphur, or tallow and fish oil, or frequently of tallow alone. The palm oil grease, patented by Booth in 1835, consisted of ½ lb. of ordinary soda, 1 gallon of water, 3 lbs. of pure tallow, and 6 lbs. of palm oil; the whole to be heated up to 210° F., being stirred round all the while, and then allowed to cool down to a temperature between 60° and 70° F., when it is ready for use.

This palm-oil grease was used almost exclusively on all railways for 10 years, and is still used, with slight modifications, on most of the English lines at the present time; it is of a light yellow color, and varies in consistency. Some

In order to have as little residuum as possible left in the axle-box, the smallest possible quantity of soda must be mixed with the grease. From 1.1 per cent. to 1.2 per cent. carbonate of soda has been found to be ample; from 2½ per cent. to 3 per cent. of crystallized soda, which corresponds to the above quantity of pure carbonate of soda, is generally used in its stead.

The mode of manufacturing this grease is very simple. The fats are melted in a pan and heated to from 82° to 88° C., while in a separate vessel the water and the crystallized soda are heated up to 93° C. Both liquids are then poured together into a wooden pail, and stirred round until they cool down. The grease will be so much the firmer the longer time it is given to cool; hence it is of advantage to manufacture large quantities at a time. As a matter of course, sand or dirt is to be kept very carefully away from the pail. The mixtures vary with the seasons, 25 per cent. fat being the minimum required in the coldest, and 35 per cent. in the hottest weather.

The following proportions have been found to answer well:

	For Summer.		For Winter.
	Cwt. Qrs. Lbs.		Cwt. Qrs. Lbs.
Tallow	4 2 0 English.	3 3 0 English.	
Palm oil	2 2 0	2 2 0	
Sperm oil	0 0 22	0 1 7	
Crystallized soda	1 0 8	1 0 14	
Water	12 0 26	12 3 12	

Allowing 2½ per cent. for loss, the above materials produce a ton of grease. The small addition of sperm oil has been found to be of good service.

The grease used on the Belgian State railways is manufac-

tured, and previously purified by boiling. The composition is as follows:

	Tallow.	Olive oil.	Old grease.
For winter	100	20	13
Spring and autumn	100	10	10
Summer	100	1	10

It is manufactured in the following manner: The vessel in which the grease is to be made is filled with the above mixture to about four inches from the top edge. The mixture is then melted and heated to about 150° C., being continually stirred round in the process. The liquid is then emptied into tubs, where it is left to congeal, after which it is ready for use.

CONSTRUCTION OF AXLE-BOXES FOR GREASE.

Grease boxes were formerly used almost universally for rolling stock on account of their simplicity and the facility of application. The grease is pressed with a wooden spade into the upper part of the axle-box, through an opening covered with a lid. A workman, carrying a box of grease and a paddle, passes up and down a train at each important stoppage, strikes open the lid of each box, replenishes it, if nearly empty, and strikes the lid down again. A portion of the grease, becoming melted by the heat caused by the friction between journal and bearing, is admitted to the journal through one or two large holes in the brass bearing. Figs. 1 and 2 represent a type of grease box, 50,000 of which are in use on the Eastern Railway of France. Fig. 1 is a longitudinal section, and fig. 2 a cross section on line A. B.; a is a grease cup, provided with an inclined opening, closed by a lid b. The gun metal bearing c is employed as usual, only for the upper half of the journal, and is provided on its under side with grooves communicating with the holes o, o so as to

distribute the melted grease uniformly over the journal. The holes *a, o* are made slanting, so that they can be cleaned out from above. A small boss on the back of the brass fits into a corresponding recess in the cup-bottom, and prevents the bearing from shifting endways. The top part of the axle-box is continued at the back over the shoulder of the journal and provided with a groove, *e*, to receive the long brake handle. The loose bottom part, *d*, is merely to keep the dust and sand from the journal and to catch the grease which drips from it, and is therefore kept as close as possible to the journal, especially at the back. The top and bottom part of the axle-box are held together by bolts, passing through side bosses, *f, f*, fig. 2, and are jointed with tongue and groove, *i, i*, to make a tight joint and prevent the parts from shifting sideways. This forms a good typical illustration of European grease boxes.

The grease boxes used on the Brunswick railways are of an entirely different construction from those in use on other lines.

Fig. 3 shows a longitudinal section, on line *A B* of fig. 5; fig. 4, a cross section on line *C D*; and fig. 5, a half top view and a half sectional plan on line *E F* of fig. 4.

There are no holes and no grooves in the brass bush reducing the effective bearing surface. The grease is put into the cup *a* and thence passes into the cast-iron trough *c* through the semi-circular openings *b, b* on both sides of the journal. The trough is loosely fitted into the bottom part, *d*, of the axle-box and supported by springs, *e, e*, which press it gently against the journal, and sheet-iron sides are riveted to it, as shown, so as to catch all the grease dripping from the cup *a* and hinder its falling into the bottom *d*. The advantage of this axle-box is that the journal is lubricated from below, so that the bearing does not need to be first heated in order to melt the grease and lubricate the journal; and also that it consumes a very small quantity of grease. Their use, however, has not extended to other lines, and is even coming to an end in Brunswick itself.

Passing from Continental to English practice, figs. 6, 7, 8 and 9 give a complete representative of a grease axle-box of the simplest and cheapest form, such as is manufactured by private wagon-building firms for "freighters' wagons" *i. e.*, wagons owned by private owners, not by the railway companies themselves. The general arrangement resembles that of the French axle-box, already described. The grease is put in from above, and finds its way to the journal through two large holes in the brass. The attachment of the axle-box to the bearing spring (which, as universally in England, is of the laminated type) is shown in figs. 6 and 7, and consists of two bolts, one of which has an eye at the lower end, and passes upwards through the plates of the spring, while the other goes horizontally from side to side of the box and passes through the eye of the former. A similar bolt, going through the box lower down, carries a cast-iron trough, which forms a loose bottom to the box. On comparing this box with earlier designs used by the same firm, the chief variations in practice are seen to be as follows: (1). The brass bearing is much narrower than formerly. It is clear that if once sufficient surface is given to the bearing to keep the friction below a reasonable limit, any further breadth is not merely useless but injurious, rendering the brass not only more costly, but more likely to fail in lubrication, and, therefore, to seize, especially if the fitting of the edges is not perfect. (2). The journal is shortened considerably, for the same reason as that just given, *viz.*, that the earlier designs were found to give a much greater bearing-surface than there was any real need for. (3). Greater clearance is given between the end of the journal and the face of the box. This is important, for otherwise, in the case of a heavy sideways blow, the axle-box is apt to get broken by the end of the journal striking it.

These boxes would weigh about $\frac{3}{4}$ cwt. per set of four, and cost from £2 10s. 0d. to £3 0s. 0d. A good workman should fit up four to six boxes in a day's work.

Figs. 10 to 16 show the standard axle-box used for both carriages and wagons on the Midland Railway, and are so complete in every detail, that no description is necessary. It will be seen that the box is of similar type to the last, but somewhat more elaborate and expensive. The bottom is made of wood, and is supported by two wrought-iron straps, hung on vertical bolts, which pass through ears cast on the sides of the box. A wooden shield is also provided at the back, closely embracing the axle just at the shoulder, with a view to hinder dust or grit from working on to the journal. The only difference between the carriage and wagon box is that in the former case the lid is of brass, and in the latter of cast-iron. It is provided with a small spring behind, to ensure its being always kept shut.

These drawings are due to the courtesy of Mr. W. G. Clayton, Carriage and Wagon Superintendent of the Midland Railway Company, which, it is believed, owns at present about 40,000 wagons, and a corresponding number of carriages. The above type of axle-box is now the single standard for the whole of this vast stock; oil, which was extensively used some time back for carriages, being now abandoned throughout the whole of the system. The same is true of other great English lines, but more will be said on this subject when treating the general question of oil *versus* grease.

§ 2. VISCOUS LUBRICANTS.

Some years ago viscous lubricants for rolling stock were largely introduced on various German lines; the principal object being to reduce the working expenses by enabling the axle-boxes to be replenished periodically at the railway shops, whereby no especial attendants would be required and the control be greatly simplified. The axle-boxes used for this lubricant are very simple and easy to keep tight, thus wasting no lubricating material. The lubricant itself

is not expensive and is rendered useless for domestic purposes by a small addition of oxide of lead, which prevents it being stolen. Recent experiments, however, made by running vehicles down an incline, proved that ordinary rape oil gives better results than these viscous lubricants, and subsequently oil-boxes have been again fitted to the vehicles of most of the above lines. The composition of the viscous lubricants used has been in general kept secret by the manufacturers, but they consist chiefly of rape oil, saponified by oxide of lead. A lubricant used on the Oppeln-Tarnowitz Railway consisted of 2 parts of sugar of lead, 2 parts of red lead and 22 parts of hard water, mixed together and submitted to a sort of distilling process. Of this fluid, 50 lbs. are put in a vessel and 40 lbs. of raw rape oil and 40 lbs. of melted American hog's lard in a liquid state are added to it, the liquid being stirred around all the while. Another form of the lubricant used on the Bavarian railways and elsewhere is a mixture of olive oil, tallow and potash in special proportions, boiled together and thoroughly churned up by a revolving shaft fitted with blades. As, however, the use of these viscous lubricants appears to have declined in Germany and not to have extended into other countries, it is not proposed to dwell on them further or to illustrate any particular forms of axle-boxes designed for their application.

§ 3. LIQUID LUBRICANTS.

(a) *Rape Oil*.—Raw rape oil, without any admixture, has been in general use on most German railways since the year 1846. At first from 25 to 75 per cent. of pure turpentine was mixed with it to prevent its congealing in cold weather, but this was soon abandoned on account of its high price and because it clogged the cotton-waste used for drawing the oil to the journal. A better mode of rendering rape oil fit to be used in cold weather in axle-boxes with cotton-waste has been invented by Dr. Ziureck, of Berlin, and consists in adding rectified petroleum. The experiments made by him have shown that a mixture of 95 per cent. of rape oil and 5 per cent. of rectified petroleum congealed at 8°–9° Cent.; 90 per cent. of rape oil and 10 per cent. of rectified petroleum congealed at 10°–12° Cent.; 85 per cent. of rape oil and 15 per cent. of rectified petroleum congealed at 15°–16° Cent.; 80 per cent. of rape oil and 20 per cent. of rectified petroleum congealed at 19°–20° Cent.

On several lines the rape oil is being mixed with oil of rosemary ($\frac{1}{4}$ lb. in 100 lbs.) for the purpose of rendering it unfit for domestic purposes.

(b) *Olive Oil*.—The excellent lubricating qualities of olive oil are shown by the small quantity of free oleaginous acid and slimy albuminous matter it contains, which makes it less liable to clog, by its moderate degree of cohesion and complete absence of mineral acids. Several large railway companies in Germany have employed it for these reasons almost exclusively; but as rape oil is generally much cheaper in that country, strong efforts have been lately made to supersede olive oil by rape oil, and on almost all German lines these have been successful. On English lines, however, olive oil is still preferred, where grease has not superseded it.

(c) *Oil of Rosin*.—Oil of rosin in the raw state is not adapted for lubricating purposes, as it contains acids which gradually act upon the iron axles, but by neutralizing it with potash, soda, or magnesia, it can be made into a good lubricant. A better method is to add to the rosin from 5 per cent. to 10 per cent. burned lime previously to subjecting it to a dry distillation process, by which the acids are confined at the moment of their generation. A lubricant supplied to the Austrian State Railway in 1861 and 1862, and consisting of 2 parts of oil of rosin and 1 part of olive oil, gave a better result than either pure rape oil or olive oil, but it disappeared again from the market when the rosin rose in price during the American war.

(d) *Mineral Oils*.—Filtered raw petroleum has lately been employed as a lubricant on the Austrian railways, the volatile parts having been first evaporated at the boiling point of water, and a small percentage of vegetable and animal oils added. The first experiments made with it were not very promising, the oil being too thin and the journals heating frequently; but by degrees the oil was improved and special axle-boxes were made to meet its requirements, so that petroleum is now rendered a reliable lubricant, at a considerably lower cost than rape oil.

The whole of the rolling stock on the Emperor Ferdinand Northern Railway and on the Empress Elizabeth Railway, has now been lubricated for several years with mineral oil, the saving amounting to 10,000 florins (\$4,860) on the former and to 5,000 florins on the latter, per annum, over the rape oil. Other Austrian railways have also introduced this lubricant on their rolling stock, to such an extent, that at Vienna, in the course of five years, the sale of mineral oil, for lubricating purposes, has risen from a few cwt. to 10,000 cwt. per annum. With regard to the physical properties of this oil, it was stated in 1867 that it congeals at a temperature of + 3° C., and that its specific gravity at + 25° C. is 0.890. The oil is free from acid, and consequently does not attack the metal surfaces, and does not clog. Its color, when in a vessel, is a bluish-black, and if held before a light, is light brown; when rubbed between the fingers, the oil feels very greasy, soft, and slippery.

At the fifth general meeting of German Railway Engineers, held at Hamburg in June, 1871, petroleum and "Vulcan oil" were pronounced to be well adapted for lubricating the axles of rolling stock, and so economical as to supersede rape oil. The oil boxes were said to require, in most cases, no alteration on changing the lubricant from rape oil to mineral oil. The representatives of the Emperor Ferdinand Northern Railway especially mentioned that they employed mineral oil for all their wagon stock and for most of their tenders;

that the consumption was not higher than that of rape oil, amounting, per axle-mile, to:

Passenger carriages.....	0.00295 lbs.
Goods wagons.....	0.00320 "
On the average.....	0.00315 "

The representative of the Saarbrück & Trier line stated that they had employed mineral oil for their rolling-stock since 1869, and that the consumption per axle-mile amounted to 0.0066 lbs., against 0.0101 lbs. of vegetable oil consumed formerly, reducing thereby the cost by more than 50 per cent.

(TO BE CONTINUED.)

Experience with Narrow-Gauge Railroads in Massachusetts.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In looking over the Report of the Railroad Commissioners to the State Legislature of Massachusetts for 1877, we find the costs of railroads put under nine heads, and if we assume the Boston & Albany Railroad to be a fair average of a finished road, we shall have the following table of percentages of the total cost:

1. Grading and masonry.....	26
2. Bridging.....	05
3. Superstructure, including rails.....	24
4. Land, land damages and fences.....	21
5. Passenger and freight stations, woodsheds and water stations.....	12
6. Engine houses, car sheds and turn-tables.....	02
7. Machine shops, including machinery and tools.....	03
8. Interest paid during construction, discount, etc.....	
9. Engineering agencies, salaries and other expenses during construction.....	07
Total.....	\$100

Of course this varies on different roads. Nos. 1 and 3 are below the average. No. 4 is above. Nos. 1 and 3 are often, in less completely finished roads, three-fourths or 75 per cent. of the total cost, and No. 7 will hardly appear at all. The items affected perceptibly by the gauge of the railroad, are only the first three, and here we may say that on any narrow-gauge location, either for two or three feet, that is justified by the topography of New England, a road with 4 ft. 8½ in. gauge can be built and operated, so that whatever saving there may be must be due solely to the construction of the gauge and not to any advantages in locating, as sharper curves or steeper grades. [It seems necessary to be constantly repeating this.] If we compare the cost of the three gauges, as to item No. 1—allowing the width of the road at the base of the rail to be 14, 12, and 10 ft. respectively—we shall have, if the ballast be 2 ft. deep on each, 20, 18, and 16 ft. for the widths of the bottom of the cuttings; at 1½ to 1 for slopes. If the cut be but 1 ft. deep, the amounts to be excavated will be as 100 to 90 and 80 respectively. If the cut be 20 ft. deep, as 100 to 96 and 92; and if we assume 5 ft. to be a fair average depth of cutting, the percentage of saving over the standard gauge will be 7 per cent. for the 3 feet and 14 per cent. for the 2 ft. But this is a percentage of a percentage. The item (No. 1) in the case of the Springfield, Athol & North-eastern Railroad is 41 per cent. against 26 per cent. on the Boston & Albany; and if we allow the saving in masonry to be the same (and it would in fact be less), the saving effected by building this road of a less gauge would be 2.87 per cent. for 3 ft. and 5.75 per cent. for 2 ft. If we say 1 and 1.25 per cent. for No. 2 (bridging), it would be a liberal allowance, as it is but a small percentage anyhow. In the next item, "Superstructure, including rails," is to be found the greatest saving effected by narrowing the gauge. This saving is effected mainly by making the rails lighter. Rankine says the weight of rail in pounds per yard should be 15 multiplied by the heaviest weight in tons on a single wheel. This would make it independent of the gauge. Of course there is some saving in ties. The Festiniog Railway uses a 50 lbs. rail. The Boston, Revere Beach & Lynn Railroad, of 3 ft. gauge, is using a 50 lbs. steel rail; it commenced with a 40 lbs. rail. This railroad is 8.8 miles long—from East Boston to Lynn. From East Boston it connects with the city proper by a ferry. Its total property is put at \$609,088, of which the ferry amounts to \$94,152. The construction account is \$399,611; equipment, \$96,903. It does a passenger business only, running along the beach most of the way. It has 6 locomotives and 23 passenger cars, besides some gravel cars. The Martha's Vineyard Railroad is of the same gauge and length and does the same kind of business, but does not run in the winter. Both of these roads do a large passenger business, and are, as far as I can judge, excellent examples of narrow-gauge roads. The Lynn & Revere Beach road has a superstructure costing \$5,866 per mile (mostly 40 lbs. rail).

The Martha's Vineyard road has lumped its first three items. The Boston & Albany, \$9,397 per mile of single track; the Springfield, Athol and Northeastern, \$9,414; and the Hanover Branch Railroad (4 ft. 8½ in.), \$7,247, with a 50 lbs. rail. The Worcester & Shrewsbury, 3 ft. gauge, cost \$493 per mile. (What kind of a superstructure can be laid for that amount?) The Billerica and Bedford 2 ft. gauge and 25 lbs. rail, \$1,756.

If the Revere Beach road be compared with the Boston & Albany, there is a saving of 37 per cent.; if with the Hanover Branch road, of 19 per cent. If we allow 23½ per cent. of saving for the 3 ft. gauge and 50 per cent. for the 2 ft., we certainly allow enough, and reducing these to percentages of the total cost and adding them to the savings of Nos. 1 and 2, we should have saved in the case of the Boston & Albany 10.82 per cent. by using the 3 ft. gauge, and 16.9 per cent. by using the 2 ft. That is not building the road for three-fifths of its present cost, as was stated, at Cincinnati, could be done.

As to equipment, engines for the standard gauge cost more because they weigh more. Those of the Revere

Beach average \$5,916 in market value; of the Albany, \$5,000; of the Springfield, Athol & Northeastern, \$6,666; the Martha's Vineyard \$6,498. The Albany rates its passenger cars at \$2,000; the Springfield, Athol & Northeastern at \$2,000; the Revere Beach at \$2,434. That is the average for all, new and old, and it is with these that they do their business. If they have cost more originally the difference has gone into operating expenses. If the rails are too light, they will wear out fast. If the cars and engines are too old, they will cost more to keep in repair. If the old cars are serviceable, new roads can be equipped cheaply with second-hand material, which is always for sale of the standard gauge.

TABLE A.

Road.	Length of road belonging to company.	Average w. of passenger cars, ex. pass. inc. locomotive.	Average w. of passenger cars, inc. engine.	Average w. of passenger cars, inc. engine.	Cost per ton dead wt.	Cost per passenger.	Dead wt. per pass.	Speed in miles per hour.
Standard gauge								
Boston & Albany	240.6	156	6	74	0.861	.005	.012	22.0-33-25
Fitchburg	63.1	105	4	48	0.830	.006	.010	22-33-32
Cheshire	53.6	110	4	30	0.712	.006	.024	3.6-25-32
Ashburnham	3.0	49	1	12	0.394	.008	.197	24.5
Hanover Branch	8.0	69	2.5	13	0.514	.007	.040	5.3 16
Springfield, Athol & Northeastern	48.5	80	2	13	0.484	.006	.037	6.1 25-20
3-ft. gauge:								
Boston, Revere Beach & Lynn	8.8	51.5	3.4	72	0.794	.015	.011	0.7 27-17
Martha's Vineyard	8.78	20	3	38	0.793	.027	.021	0.8 20
Grafton Centre & Worcester	3.0	1	5	0.228	.045	.045	.045	10.4
Shrewsbury & Fitchburg	2.7	20	1	8	0.192	.010	.034	2.5 10
3-ft. gauge:								
Billerica & Bedford								

* Does not run in winter.

† Run by dummy engines.

‡ There is no freight business done on the narrow-gauge railroads, so I have used passenger traffic throughout.

§ Insufficient returns. Not now in operation.

TABLE B.

Locomotive expenses:	Boston & Albany	S. A. & N. E.	Hanover Br.	B. R. B. & Lynn
Repairs of engines	\$274,541	\$1,560	\$149	3 ft. gauge, \$5,688
Fuel for engines and cars	625,885	8,148	1,816	6,331
Oil and waste	58,170	869	465	1,384
Total	\$958,596	\$10,577	\$2,430	\$13,403
Per engine	3,945	3,526	1,215	2,233
Miles run by each engine	20,764	33,021	11,530	15,686
Cost per mile	\$46.190	\$31.107	\$20.105	\$8.142
At load dead and paying (Tons)	260	119	60	51.5
Cost per ton	.0007	.0009	.001	.0027

This table is of course but a rude approximation—as in the two broad-gauge roads the freight trains enter largely, as it is impossible to separate them in the returns. As the freight mileage of the Boston & Albany is about three times that of the passenger trains, I have taken three freight and one passenger train and divided by four to obtain the above average weight.

In the case of the Springfield, Athol & Northeastern Railroad, the freight mileage is but one half that of the passenger, and I have taken two passenger trains and one freight and divided by three to obtain the average weight. The Hanover Branch does not report any freight mileage, although it carries freight.

Cost of Car Repairs.

	Boston & Albany	S. A. & N. E.	Hanover Br.	B. R. B. & Lynn
Repairs per passenger and baggage car	\$361	\$132		3 ft. gauge, \$167
Average car mileage	34,368	22,959		11,162
Cost per car per mile	1 cent.	6-10c.		1 1/2c.

Here we have a few items taken from the Commissioner's report: If we set on one side the Grafton Centre and the Worcester & Shrewsbury, which might be compared with horse railroads, we may in some fashion compare the others. The average weight of train of the six 4 ft. 8 1/2 in. roads is 95 tons; the average cost per mile \$0.6490. The average weight of train of the 3 ft. roads is 40.25 tons; cost per mile, \$0.7935; a saving for the standard gauge of \$0.1445 per mile, or 18 per cent. of the cost of the 3 ft. gauge. The Albany and the Fitchburg roads cost more per train mile than the 3 ft. gauge, and so do all roads of their class in the Report. Something of this, perhaps most of it, is due to the greater locomotive expenses—see Table B; but it is probable that the expenses of the 4 ft. 8 1/2 in. roads in that table are higher than passenger engines will average. In repairs of cars, the standard gauge shows a saving. Both the Albany and the Fitchburg roads charge a large sum for new equipment to operating expenses. Neither of the 3 ft. roads have any such charge. In cost per ton hauled (exclusive of passengers) the economy is largely in favor of the standard-gauge, and perhaps some of this may be due to that very extra dead weight that our narrow-gauge friends so abominate. The report certainly shows a large saving for the 4 ft. 8 1/2 in. in repairs per car mile. In cost per passenger the

Revere Beach has the best showing, owing mainly to the exceptionally favorable nature of its traffic.

It clearly would not pay the Ashburnham road to narrow its gauge, for it hauls a dead weight of 24 1/2 tons per passenger at about half what it costs the Revere Beach to haul 1 1/2 tons of a ton. To match the favorable showing of the Revere Beach road, it is not at all necessary to reduce the weight; what is needed is more passengers. This is the case with all the 4 ft. 8 1/2 in. roads. If it be asked why haul so many empty cars, the answer is, the travel is variable—full one day, empty the next; full one way, empty on the return. From this variation the Beach road is free, to a great extent, as may be seen from its high average of passengers per train.

These figures are all practical; they are the results of facts with no "suppose" about them, and if not absolutely accurate are at least a very close approximation, and they give results very different from those spoken of by Mr. Ramsey at Cincinnati (see *Gazette* of July 26). He gives the cost of hauling a certain number of tons on a 3-ft. gauge and then adds 70 per cent. to the dead weight as excess of 4 ft. 8 1/2 in. cars over those of 3 ft., and very coolly estimates the cost of hauling by the same engine—too light to do it with any economy. If he uses a theoretical engine let him use theoretical cars also. Let us have one weight and one measure. It does not cost twice as much to run a 40-ton engine as it does to run one of 20 tons, nor does the cost in practice appear to have any absolute connection with either weight of engine or gauge of road. Suppose in Mr. Ramsey's case we substitute the cost to the Boston & Albany and Revere Beach roads, thus:

Tonnage, 3-ft. gauge, 900@.015	\$14.40
4 ft. 8 1/2 in. gauge, 1,630@.005	8.15

Saving by using standard gauge and heavy cars (per mile).....\$6.25

To judge from the Massachusetts reports, the economy of operation of the standard-gauge would more than offset the extra capital required in construction and equipment.

J. D., Boston.

The Narrow-Gauge Discussion.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I would call your attention to one little discrepancy that inadvertently crept into your criticism on my remarks last week; you say, "The narrow-gauge roads are all, or all but one or two, light railroads, lightly equipped; the standard-gauge railroads are mostly heavy railroads, and many of them heavily equipped;" of the railroads of California, to which I referred, I find that the standard-gauge roads have one locomotive to every 8,143 miles of road, and one car to every 0.349 miles of road; the narrow-gauge roads have one locomotive to every 7,378 miles of road, and one car to 0.313 miles of road. My authorities may be wrong, and although that is hardly an excuse, it may be an extenuating circumstance.

I would also call your mind to the contemplation of the Los Angeles & San Diego Railroad (standard-gauge), which is reported to have cost \$2.08 per mile; if you would compare this road to the Denver & Rio Grande (narrow-gauge) Railway and hold it up to an admiring throng of standard-gauge, right or wrong, advocates, doubtless they would applaud. But, as the question of "gauges" is now in the hands of able gentlemen, who will undoubtedly search out the truth from the mass of conflicting evidence, we shall anxiously await their report.

One would think that the representative railroad journal of the East would treat with some show of fairness and courtesy anything that tended to solve the problem of cheap transportation, when the subject is so vital to the future development of the country, even were they fallacious; the evil tendencies should be set right, the doubtful theories made positive. Time will do these things, but "brow-beating" never. Critics, at most, can only retard or hasten a new theory a few months, or a few years. At least, in good time, they will either sink into merited disuse, or shine in their true light.

L. B. L. Jr.

JULY 29, 1878.

[This is only further proof that the comparisons made are worthless, for the simple reason that things of the same class are not compared. A railroad may have the same number of locomotives and cars and yet one be lightly and one heavily equipped. As a fact, the average standard-gauge locomotive in California probably weighs as much as 36 tons, and the average narrow-gauge locomotive not half as much, and probably not more than 16 tons; and their tractive capacity is very nearly in proportion to their weight. But the fundamental difference between the Central Pacific, made to carry heavy trains at the highest practicable speeds, and an ordinary narrow-gauge road, made to carry very light trains at low speeds, excludes any idea of comparison. The narrow-gauge roads, with 35 lbs. rails and 15 ton engines with a maximum speed of 15 or 20 miles an hour, can only properly be compared with standard-gauge roads with rails and rolling stock similarly light, such as most roads in this country had thirty years ago. The reports of the average cost of roads taken from capital accounts are, as everybody knows who has occasion to deal with them, often utterly misleading. The extremes are made of companies with an immense capital not represented by construction—as \$300,000 a mile in the Erie and the Atlantic & Great Western, for properties that could be replaced by a quarter, and in one case by probably a seventh part of that sum; and on the other hand by

roads bid in at foreclosure sales, with a few thousands of dollars capital in place of millions that the property cost to build, and of millions more that were once carried on its books as stocks and bonds. Railroads of all gauges come under this category, and there are many narrow-gauge roads whose reported capital outstanding is twice as great as the actual cost of construction, as there are others that have not the whole amount of their cost represented by their stock and bonds. We confess to no intolerance or "brow-beating" in this discussion. We have always welcomed all facts that throw any light on it, of any kind; but there has been a most wonderful dearth of them brought forward by the advocates of the narrow-gauge. Their "arguments" have very largely consisted in such inferences as this: "The Pennsylvania Railroad cost \$100,000 per mile; the narrow-gauge railroad cost \$15,000 per mile; therefore a narrow-gauge road is very much cheaper than a standard-gauge road." This we do not admit to be argument, and we do not conceal our impatience when it is offered as a serious contribution to the discussion of the question.—EDITOR RAILROAD GAZETTE.]

The Future of Iron Rails in the United States.

[From the Report of the Secretary of the American Iron and Steel Association for the year 1877.]

While the manufacture of steel rails in this country seems to rest on a firm foundation, the increasing demand for these rails being due to their substantial merits and not to fictitious or temporary influences, it must be confessed that the future of iron rails is not so well assured, and that the present condition of the business of manufacturing them is far from cheering. As we have already shown, the production of Bessemer steel rails has steadily increased in this country since the industry was established, while the production of iron rails has steadily declined since 1872, when it reached its maximum development. In that year we made 905,930 net tons of iron rails; in 1877 we made 332,540 tons—a decrease in five years of 573,390 tons, or about 63 per cent. Such a remarkable decline in the manufacture of a leading product of American rolling-mills may well challenge attention and justify a brief inquiry into the probabilities of its continuance.

Several considerations seem to point to the conclusion that the manufacture of iron rails is not about to cease in this country; they rather indicate a certainty that it will recover at no distant day from its present depression. These considerations may be stated as follows:

1. The building of new railroads is now at a very low ebb, not at all commensurate with that healthy and normal growth of the country which must come with a general revival of business activity. It is not for one moment to be supposed that we will rest satisfied with the construction of less than 2,200 miles of new railroad annually, as was the case in 1877. When the building of new lines of railroad takes a fresh start, the caution of capitalists, who will not as in the past engage in railway enterprises regardless of expense or consequences, will in many instances turn the scale in favor of iron rails, for they will cost less than steel rails, and will wear many years where the traffic is light, as is the case with most new roads.

2. Of the new railroads that are now being built, or likely to be built in the near future, many are narrow-gauge roads. As one motive to the construction of narrow-gauge roads is economy, and as the wear and tear of a narrow-gauge track is not likely to be so great as that of a track of the ordinary width, it is a reasonable presumption that rails which cost the least money will be preferred for these roads.

3. Railroads already constructed that are financially crippled, or that do not have steep grades or sharp curves, or are not favored with a heavy traffic either in freight or passengers, all of which conditions are found on many roads in every section of the country, will not be so likely to have their tracks renewed with steel as with iron rails so long as the difference in cost is \$8 or \$10 a ton.

4. Sidings and branch roads or feeders do not usually require to be laid with rails of as good quality as the tracks of trunk lines, and hence it may be inferred that the policy of using comparatively inferior or cheaper rails for these sidings and branches will be continued.

5. So many iron-rail mills exist in parts of the country remote from Bessemer establishments, and from markets for the sale of old iron rails, that the re-rolling of old rails at these mills must continue so long as the local supply is continued. Many years must elapse before this supply will be materially diminished by the substitution of steel rails. The saving of freight on steel rails from the works where they are manufactured to the remote points alluded to where iron-rail mills exist, is an element of cost in the renewal of tracks in the sections which are naturally tributary to these mills that will of itself, apart from other considerations, weigh heavily in favor of re-rolled iron rails. It is a significant fact that mills have recently been erected at Rosedale, Kan.; at Pueblo, Col.; and at Laramie, W. T., expressly to re-roll iron rails.

6. Iron-rail mills which are near to Bessemer steel establishments will have, for some time to come at least, a local demand for re-rolled iron rails, simply because they are cheaper than steel rails. Many railway companies that are in good financial condition and doing a fair business will be more disposed to continue the use of iron rails and thus assure immediate dividends than to increase their maintenance-of-way account by buying steel rails.

7. The Philadelphia & Reading Railroad Company, owning its own iron-rail mill at Reading, will probably continue to use iron rails for many years. In his last annual report President Gowen says that, "notwithstanding the enormous traffic of the company, out of 150,787 tons of rails made at the rolling-mill and laid in the track since 1868, inclusive, but 25,851 1/2 tons, or 17 1/2 per cent., have been worn out—a result that fully justifies the wisdom of adhering to good iron rails during the periods when the difference in price between iron and steel was so great as it was in all years prior to 1877."

8. Mine roads and street railways will probably continue to be mainly laid with iron rails so long as their cost shall be materially less than that of steel rails.

The foregoing statement of facts and probabilities is frankly submitted in view of the very rapid decline in the production of iron rails in 1877. Without this statement it might be inferred by the cursory reader that the iron-rail business of this country is likely to become an extinct industry in a very short time. We do not think so. Deservedly popular as steel rails are with most railway companies that can afford to buy them, we think that it must be conceded, in view of the foregoing considerations, that they are to continue to find in iron rails a strong competitor.



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EDITORIAL ANNOUNCEMENTS.

Passes.—All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.

Addresses.—Business letters should be addressed and drafts made payable to THE RAILROAD GAZETTE. Communications for the attention of the Editors should be addressed EDITOR RAILROAD GAZETTE.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

THE RAILROAD PROBLEM.*

Mr. Adams occupies a peculiar position in this country among students of railroad affairs. From the first he seems to have set himself the task of observing the railroads in this country especially in their relation to the community—including not only shippers and travelers, but stock and bondholders in this community. We might say, perhaps, that it is the public side of railroad business that he studies, except that there is by no means any common consent as to what is the extent of this public side; and a main part of the discussion regards this very question. But Mr. Adams' position is not peculiar so much on account of the field of his inquiries as by reason of his attitude. Other men, here and abroad—and especially abroad—study the relations of the railroads to the community, and express opinions freely and make plans and draw up policies. But they usually seem to aim at a final solution of the question. They point out evils and dangers, and after certain definite measures by which they purpose to do away with these evils forever. Having gone so far, evidently there is nothing more for them to do except to become propagandists and endeavor to secure the adoption of their plans. So it is with the advocates of exclusive state-ownership in Germany, Belgium, Italy and France. They have settled in their minds that things will never go right until the government owns and works all the railroads. Thus questions of combination, of tariffs—the whole current history of railroad transportation, in fact—has nothing more than a superficial interest to them. They do not expect to learn anything from it. Development in railroad affairs for them has closed.

Mr. Adams' treatment of the subject has been radically different. He does not pretend to have solved the railroad problem; he does not present any plan or search for any plan for its final, complete and universal solution; what he does is to watch the development of the problem in the history of railroad trans-

portation, confident that it will, in great measure, solve itself, and that if the community observes this development intelligently, and insists upon proper and reasonable precautions and checks when its aid is needed—that is, when legislation is required to give sanction to measures proposed by the railroad companies chiefly for their own benefit and protection—a natural solution of the railroad problem may be arrived at, or, at least, the interests of the public may be protected down through a series of changes in railroad management, so that there may be a series of solutions—the need of the time being provided for when the need arises.

Railroad administration, and especially the conduct of competitive business, is not a fixed and unchangeable system. It changes and develops. It tends, when working freely, to fit itself better to its environment. The railroad organism acts for itself, but it meets the opposition of circumstances that surround it, here changes or fluctuations in production, there the opposition of the community, and it is the forces without as well as the forces within that determine its form and functions. And in these days of its youth and growth, as we may still call them, it is especially important that its development should be free. Any form in which it might be finally fixed, if the thing were possible, would inevitably be an imperfect, incomplete form—much more so, probably, than if railroads were three hundred years old or so.

The attitude of Mr. Adams, then, seems every way commendable. He does not pretend to know what will need to be done, but he purposes to watch and see, and call for the doing of it when the time comes. He fights a waiting campaign, none the less confident because he has no plan of action, no further immediate purpose than to watch and wait.

But there are doubtless still some—and not a few—who will deny that there is any railroad problem, and assert that Mr. Adams is throwing away his time in watching the course of railroad affairs and calling public attention to them. There is nothing peculiar about railroad business, they say, except that it is big. Only let it alone and it will take care of itself, just like any other business, and the community will need no special protection, any more than in ocean transportation or the grain trade. When it is objected that the competition does not apply to railroad transportation as it does to lake or ocean transportation and to most other kinds of business, these people have no difficulty in finding an answer. The facts, they say, are in the other direction. There is no business carried on by man in which competition is fiercer than in that of railroad transportation. Here they tell the truth, but not the whole truth. The very fierceness of railroad competition is due to the fact that on most lines a considerable portion of the business is not exposed to competition, and so forms a trustworthy support; and the excessive reduction of rates on competitive freights are one of the hardships which the community has to complain of—under the existing circumstances, a much greater hardship than excessively high rates on non-competitive traffic. Now, circumstances over which the community has no control often determine whether or not a business can be carried on at all at a given point, and, worst of all, a totally unforeseen change, not designed by anybody, but happening as a result of the competition for traffic, or its cessation, may totally change these circumstances.

It is true that economists who claim that railroads must be regulated as monopolies do not usually appreciate the large proportion of their traffic—often by far the largest part—which is competed for by railroads; nor, in this country, the enormous proportion of the traffic over long routes which is exposed to the more effective competition of the water routes. The effect of this, however, is to exaggerate the discriminations between places which do and those which do not have competing routes bidding for their traffic. It does effectively, in nearly all cases, prevent the public injury usually resulting from a monopoly, that is, excessive profits to the monopolist. The lack of competition at some points in his field is fully made up—often much more than made up—by its excess in others. Practically, taking the railroad system as a whole, it is evident that whatever monopoly the railroads enjoy does not enable them to make extravagant profits; and even taking the roads separately, very few cases indeed will be found where a very large income on the investment has been secured through a monopoly of the traffic. Very large profits have been made, it is true, and in some cases must be made, if we are to have any railroads, where the risks are so great as they are in this country; but very seldom have they been made through a monopoly of traffic. The most profitable railroad in America to-day competes for probably 99

per cent. of its freight traffic, and that with water routes, which are accessible to nearly all its stations and to all its important cities.

What the public has to complain of is not that railroad profits are too large, but that they are too unequally assessed; that a great part of the traffic contributes nothing or next to nothing toward the interest on the investment, while the rest of the traffic pays the whole.

Now the railroad companies have found that the proportion of traffic for which there is little or no competition has grown less and less, and at the same time the struggle for the competitive traffic has grown fiercer and the profits on it less or the losses greater. In a vast number of cases it is impossible to make a tolerable income on the investment; advances cannot be made on local traffic to make up for losses on through, and the consequence is the general and earnest endeavor to restrain competition and make the vast traffic now competed for pay its share of the interest on the capital invested in railroads.

The public is not, as a whole, greatly interested in having the railroads prosperous. If the railroad system were yet to be constructed it would be, but most of the present population is abundantly supplied, and does not care to offer premiums for the further extension of the railroad system. It is, however, greatly interested in having rates stable and equitable, and to secure these ends would doubtless consent to some advance in the average through rates. But whether it desires this or not, it cannot complain if rates are made which afford a profit on the investment. The public would prefer to pay five rather than seven cents a yard for cotton cloth, and would not be much disturbed if it knew that five cents left no profit to the manufacturers and cotton-planters. But it could not complain, and would not, if the price were made high enough to yield a reasonable return to all engaged in the production of the material.

But what the public needs and asks for—a rational proportion between through and local rates and steadiness in all rates—cannot be hoped for without some sort of concentration of railroad authority. So long as we have a hundred corporations perfectly independent, the action of any one of which necessarily affects the policy of many others as to some part of their traffic, no one can reasonably require of any company that these points be observed. They are just as helpless as the public itself, and are themselves the greatest sufferers by the policy which the public condemns. Now, with public opinion clamoring for what only concentrated power of some kind can command, and the railroad companies suffering constantly from the effect of the conflict of independent powers, forces are working in both directions to compel a railroad centralization. It may be by combination, in which the matters subject to the central authority may be as few as possible, and it may be by consolidation, in which all the roads will be under a common head; and it very likely will be in both ways at once, there being nothing incongruous in them. The recent change of management in the Michigan Central is an example of the readiness with which power may be concentrated as in a consolidation without in any way changing the relations of the corporations, or making a single contract. It is easy to understand how in the future the proprietors of some independent railroad which has suffered from excessive competition with a rival may deliberately hand it over to the managers of that rival with the understanding, expressed or understood, that they shall do what is best for both properties.

But it is combinations for limiting the competition for traffic that engage attention most at this time, and a more immediate effect may be expected from them than from the actual union of railroads, as a combination may be made at any time which will control the railroad traffic of an enormous territory, whereas under the most favorable conditions it would require many years actually to consolidate the railroads of such a territory, if it could be done at all.

To Mr. Adams combination appears likely to afford an opportunity for a public advantage such as would not result from an extended consolidation; at least it may, if established on a basis making the confederation of railroads public and responsible and working through legal methods.

Generally, we may say, the popular suspicion of railroad combination and consolidation is due to a misapprehension, not so much of what may happen as of what actually does happen. No possible situation of the railroad companies can cause railroad business to be regulated by free competition like most other kinds of business, and the partial competition which alone is possible works largely to the disadvantage of the public as well as the railroads; while the chaos resulting from the separate action of hundreds of individual companies makes it impossible to hold any one

* Railroads: Their Origin and Problems. By Charles Francis Adams, Jr. New York: G. P. Putnam's Sons.

responsible for the conduct of railroad business, as it actually prevents any one from deliberately selecting and carrying out a policy. It cannot be too soon understood by the public that the healthy competition which is the best of all regulation of ordinary business is an entirely different thing from the partial competition which is all that can possibly be secured in railroad business, and which inevitably results in the greatest discriminations. And for the natural and justifiable fear of a monopoly, it should be remembered that to a considerable extent a monopoly is inevitable in railroad business, that an extension of it brings a more than proportional responsibility, and that in this country the community will quickly and surely find a remedy for any such evils as extortion or unjust and preventible discrimination, so soon as the responsibility for them can be fixed, as it always could be if the railroads had as full control of their through as they have of their local tariffs.

THE ART OF GOVERNING.

There has been an immense amount written on the science and art of civil or political government, and theories and systems innumerable have been devised which were intended to give protection to "life, liberty and the pursuit of happiness." Even domestic government is not without its literature, but the art of governing or directing corporations, like railroad companies, has, so far as we know, not been formulated into any very definite theories or systems. In fact, it is only within a few years that the subject has assumed very much importance, and it is therefore not surprising that it is still in a very vague and chaotic condition.

An early stage of nearly all government is that of an absolute monarchy, and it may be said that the government of railroads is just beginning to emerge from this condition. An absolute monarchy, no doubt, would be the most efficient of all governments if it were possible to find a monarch sufficiently good and wise and strong, but herein lies the difficulty, which applies to railroads as well as to nations, when they increase in size and importance. The patriarch of a family or the chief of a tribe was usually supreme in authority, but as the tribes developed into nations, it became necessary to delegate authority and duties to others. As in the government of tribes, so in railroads; as they increased in size and the duties of their government multiplied the chief was obliged to delegate to others what he could not do himself. When short railroads were first built their government and control naturally assumed a sort of patriarchal form. Some one man was placed in supreme control, and he directed everything. But as the roads were extended and consolidated, the duties of the managers increased so rapidly that one duty after another had to be delegated to some one else, and now some of the companies have a system of government almost as elaborate as that of a small state.

Systems of government of railroads will not be discussed here, although the subject needs elucidation very much. The principles which underlie it have, so far as we know, never been clearly set forth. The same is true of the art of governing, although some very wise observations have been made by different men who have occupied positions where they have been obliged to exercise that art.

It is probable, too, that it is not nearly so well understood here as it is in Europe. There are a number of reasons for this. In the first place the great majority of those who occupy positions of authority here commenced life and had their whole early training in places where they were obliged to obey and not give orders, and insensibly the idea that duty means the doing of the greatest number of things has become a habit of their minds. It takes a conscientious mechanic, who has been accustomed during the first half of his life to working ten hours per day, beginning at seven in the morning, and "quitting" at six in the evening, a long time to convince himself that he is doing his duty to his employers, when promoted to a position of authority, if he does not give full ten hours daily to their service. It may be, of course, that he should do so, and at times give even more hours; but if so, the reasons for it will be quite different from those which required ten hours' service as a workman. Many men, after carefully systematizing what has been intrusted to them, look quietly on, and do nothing more than to watch for things which do not go right, and correct them, and thus serve their employers much better than the pushing, fussy sort of man who never seems to be happy unless he is uncomfortable.

It is not easy for a man with great responsibility to give just the proper amount and kind of regard to de-

tails. It is, of course, impossible for any one at the head of a large railroad to give heed to all the minute affairs of its operation, but still these should be under his control to such an extent that at any instant he may call up and learn all about the smallest matter. They should be arranged in some way analogous to the accounts in a system of double-entry books. It is not possible for any manager of a large business to keep in his mind or regard all the entries which are made in the journal or cash book, but he should have them all classified in his ledger so that not only the general results may be summed up, and either carried in his mind or on a small slip of paper; but the smallest item should be so recorded that it can be traced out to its source if necessary. The ideas of the manager of a railroad should be arranged like his papers. If the latter are scattered indiscriminately they will be useless, and any attempt at dealing with them in detail when in that condition will be quite futile. They must be classified in bundles and arranged systematically in pigeon-holes. They can then be dealt with in the aggregate or in detail. In an analogous way a railroad manager must be able to think "in bundles," or, when occasion requires, to untie his packages of thought and examine them with microscopic minuteness.

A man with great experience in governmental affairs has said that "the greatest error that any governing man in high position can make, whether he be the head of a government department, of a merchant's office, or a draper's shop, is the attempt to do too much himself. This is one of the most common errors of railroad managers. Some of them seem to imagine that it is their duty to supervise everything personally. They will arrange the time-tables, fix the passenger and freight rates, draw up specifications for cars and locomotives, personally direct the design of a new bridge, and assume the duties of an architect of a depot—all of which would probably have been done very much better if the manager had confined himself to the selection of some specialist to do each one of these things. His duties are somewhat like those of an editor of a great newspaper. If he does comparatively little writing, and instead employs his time in ascertaining what needs to be written about and in getting the ablest men to write for him, he is quite sure to make a better paper than he would if he undertook to do everything himself.

Perhaps the wisest thing that our wise man already quoted has said on this subject is, that the error of a governing man attempting to do too much himself is that it "nearly always proceeds from moral defects—from vanity, conceit, fussiness and an overweening regard for one's own peculiar way of doing work." * * * There is generally an absence of generosity in such men; they do not love the excellence of other men." Such a person, if a duty is delegated to any one else, and is performed faithfully, with perhaps more knowledge and a better understanding of the subject than the governing man himself would have shown, is almost sure to feel envious of the excellence of the deputy. In other words, the master is apt to prevent things being done in the best way from feelings of personal jealousy, and thus allow his own baseness to stand between himself and the true interests of his employers. There is hardly any trait in a railroad manager which is likely to prove so costly to the interests which he is supposed to guard as a certain narrow selfishness or a lack of magnanimity. It will at times dry up his sense of duty to his employers at its fountain head, and instead of causing him to seek for knowledge and wisdom, it will lead him to fear the one and shun the other.

Our wise man has also written another true thing of such men, which, as no doubt many of our readers will see, applies with great force to managers whom they could name.

He says "they are pleased to forget their own mortality, and to omit seeing that the grand thing is to leave behind you those brought up under you who shall be able to do as well as yourself, or even better." This is terribly true of some men who receive nearly supreme control over great interests. That it is so is shown often by the effect which the health, or life of some prominent railroad manager has on the price of the stocks of his company. A rumor of ill health depresses the market or a physician's favorable report will put up the market several "points." Now if it were known that trained and competent men, entirely familiar with the duties of their chief, stood ready to assume them when he was inexorably obliged to lay them aside, there would be no such apprehension. It might be said, too, that while some railroad managers lose sight of their own mortality they also forget the immortality of their companies. The first must die: the latter need not.

Our author, from whom we have taken the above texts, describes a certain class of men whose offensive

assumption of superiority makes them a fair target for criticism. He says: "Mere hardness is often mistaken for cleverness, or rather gives a biting edge to it, which makes one think more highly of it than it deserves. * * * It must be admitted that the hard man has often a great apparent advantage in reasoning, as he is troubled by no sentimental difficulties, abjures all feeling, and keeps closely to the aspect of the affair at the present moment. * * * They are boastful, too, and thank God for their deficiencies—in that they have not been afflicted with much sentiment, affection, piety, pity or imagination, to mislead them."

It should be said of some men, though, that they assume what appears to be this kind of hardness in self-defense. The dead-beats, moral vampires, land-sharks and bores which hover perpetually about a railroad manager's office, ready always to prey on his credulity, sympathy, generosity or charity, are numberless and apparently immortal. In self-defense the manager is obliged to encase himself in a shell like a turtle, and is able to put out his head only when there are no enemies near; but this condition is quite different from that hardness of nature which is often only a form of mental and moral dullness.

It seems probable, too, that hereafter more importance than heretofore will be assigned to a high order of moral qualities in railroad management. The chiefs of the through lines, after years of dismal experience, finally seem to have learned unquestionably that war between them is inevitable unless they keep absolutely good faith with each other, and it seems probable that the inherent condition of things may produce a code of honor among railroad men as strict as that which exists in most regular armies. It may be that among the questions which will be hereafter asked when a man seeks a responsible position will be such as these: Is he faithful and truthful, absolutely honest, able to discriminate between a bribe and honest wages: is he generous, magnanimous and just, and able to see both sides of a question?

Record of New Railroad Construction.

This number of the *Railroad Gazette* contains information of the laying of track on new railroads as follows:

Kendall & Eldred.—Completed by laying track from Sawyer City, N. Y., west by south to Rixford, 6 miles. It is of 3 ft. gauge.

Worthington & Sioux Falls.—Extended from Valley Springs, Dakota, west by south to Sioux Falls, 15 miles.

San Pablo & Tulare.—Track is laid from Martinez, Cal., east 5 miles, and from Antioch west 15 miles, making 20 miles in all.

This is a total of 41 miles of new railroad, making 941 miles completed in the United States in 1878, against 880 miles reported for the corresponding period in 1877, 1,046 in 1876, 594 in 1875, 913 in 1874, 1,966 in 1873, and 3,373 in 1872.

WATER RATES have made an important advance since last week, the changes being an advance from 1½ cents for corn and 1½ for wheat from Chicago to Buffalo, to 2 cents for corn and 2½ for wheat, and by canal from 4½ for wheat, 3½ for corn and 2½ for oats to 4½, 4½ and 3 cents, respectively, from Buffalo to New York. At the same time a decline is reported (Aug. 6) in rail rates from Buffalo to New York, making them actually lower than the canal rates, namely, 4½ cents for wheat, 4 for corn and 3 for oats. At the current all-rail rate from Chicago to New York of 25 cents per 100 lbs., the proportion from Buffalo to New York amounts to about 7 cents per bushel on wheat, and a 4½-cent rate is equivalent to only 16 cents per bushel from Chicago to New York. Rail transportation is not always preferred, however; when grain is forwarded faster than it can be exported, and so will have to be held in store some time, the slow transportation by canal is sometimes preferred, as saving storage charges. At present New York prices for September and October delivery are higher for corn, but not for wheat, than for August delivery. The higher lake and canal rates increase the chances of the railroads getting a share of the grain at their advanced rates. There is no doubt, however, that they will do better not to carry at all than to accept business at the 16-cent rate of July. The present advanced rates by lake and canal amount to about 7½ cents per bushel for wheat from Chicago to New York. This is just one-half the all-rail rate, and can hardly be expected to permit much grain to go through by rail for export, except when the cost of reaching the lake is much more considerable than that of reaching a railroad where through rates apply. But this is an exception of a good deal of importance, and besides there is the large traffic in grain for domestic consumption at interior points in the East, which, except directly on the line of the canal, the railroads can be pretty sure of.

Ocean rates seem to have nearly recovered the position occupied before the recent depression. Grain by steam to Liverpool was quoted at 7½d. to 8d. Tuesday, through to London and Glasgow engagements at 6d. to 6½d. were reported.

BASKET WILLOWS are warmly recommended by a German official for the planting of the slopes of railroad excavations and embankments, especially where the soil is loose. On one of the leading railroads of Prussia they have been tried and found to answer admirably. A perfect network is formed by

the roots which binds the whole surface firmly, the thick, green growth transforms the raw and ghastly gashes in the earth into a beautiful thicket; the men who take care of and watch the track can easily care for the willows, which grow readily in dry as well as wet soil, if it is a little loose, and where there is market for basket material the growth can be made profitable. There are hundreds of kinds of willows, but those recommended for this purpose are the *salix viminalis*, the *salix pruinosa*, but most of all the *salix amygdalina* (*triandra*). In dry ground the cuttings should have a good length underground. They will then put out a multitude of roots in every direction and make up for the want of abundant moisture by the extent of the ground from which they draw. If there is any way to hide some of the horrible wounds which railroads have made on Nature's face, it is much to be hoped that it will be tried, and the advantage offered by the willow by preventing the washing of slopes gives an economic as well as an aesthetic reason for planting it.

THE BROTHERHOOD OF LOCOMOTIVE ENGINEERS has reported few expulsions for the past two or three months, and has recently organized two new divisions, one at Los Angeles, Cal., and the other at Winona, Minn. There have been some reports this year of a "general strike" to be made on the railroads this summer, but there seems to have been absolutely no foundation for them. A strike at this time is extremely improbable, and especially one by the Brotherhood. It, as too many forget, was not concerned in the strike of July, 1877. But it had struck so many times during the previous year, on various roads, that it was at once assumed by the general public that it planned the July strike, and it still gets the credit of that deplorable event with a great many people.

THE LONG BEACH CONFERENCE, which seems to be occupied chiefly with negotiations over the live stock traffic, is being held as we go to press, so that we are unable to give a statement of its final result.

NEW PUBLICATIONS.

Locomotive Engine Driving: A Practical Manual for Engineers in Charge of Locomotive Engines. By Michael Reynolds, Locomotive Inspector, London, Brighton & Smith Coast Railway. With illustrations. London: Crosby, Lockwood & Co.

This book is one of a number sent in for review, which have accumulated during the past year, and which deserved a much earlier notice.

The book, as its title and that of the author indicates, is written for practical men by a person of experience in running locomotives in England. The latter fact gives it a somewhat foreign and unfamiliar character, which will at once be noticed by Americans. Its very title, "engine-driving," is not used here, and "engine-driver" is regarded as a somewhat offensive term by the persons in this country whom it is intended to designate. Such terms as "horn-blocks," "big-ends," "little-ends," "screw-shackle," "fire-bars," etc., will not only be unfamiliar to American locomotive engineers, but some of them, as "big-ends" and "little-ends" (used to designate the stub-ends of main connecting rods), will puzzle many Americans to know what they mean. But the general principles of running locomotive engines are the same in England as in this country, although there are some differences in the construction of locomotives, and also in the practice of operating railroads in the two countries. The general character of the book cannot be better described than in the author's own words in his preface, in which he says:

"In the first part the elements of the locomotive are described, the general working conditions are specified, the principles and methods of inspection are elaborately set forth, and the causes of failure are analyzed and exposed. Moreover, the various duties of an engine-driver, from the moment that he enters the running-shed until he returns to it, are completely but concisely explained; while the duties and the training of a fireman are described with much detail, and the principles of the management of the fire—not an easy problem—are fully investigated.

"With a brief notice of the arithmetical problems which most usually come within the range of an engine-driver's practice, the scientific principles of expansion, combustion, etc., involved in his practice, are explained.

"Finally, the groundwork of examination for first-class, second-class and third-class certificates of proficiency is succinctly set forth; to which is added a carefully compiled collection of regulations for enginemen and firemen."

The general description of the locomotive occupies twenty-four pages, and is illustrated with five engravings. This description is of a very general and somewhat superficial character, and is not explicit enough to make the construction of a locomotive understood by those who know little or nothing about it, and to those who have a practical knowledge of locomotives it would seem to have little value. The same thing is true of the chapters on setting slide-valves and that on "How to become a model engine-driver."

The most valuable portion of the book is that in which the author gives directions for the inspection, the running and the firing of locomotives. All that he says in regard to these subjects has evidently been suggested by practical experience, and many of the hints which are given can be turned to practical account by locomotive runners anywhere. The directions to firemen could only be followed when the fuel is similar to that used in England, but there are many general directions that are applicable anywhere. But there is often an irritating want of explicitness. Thus in the directions to firemen for "making-up the fire," there is no mention at all of the use of kindling wood, which leads an American reader to inquire whether fires are kindled in England without wood and if so how it is done. If wood is

used, it certainly would be desirable that a fireman should be taught how to use it with best advantage.

The following directions will, it is believed, be new to American firemen:

"When the fireman has satisfied himself that there is plenty of water and steam in the boiler, with sufficient fire in the box to cover the bars a few inches, he should obtain some old fire-bricks and break them up to the size of a teacup, and then sprinkle them with the shovel over the grate-bars, particularly at the corners. By the adoption of this expedient the bars will be prevented from burning by exposure to the heat; it will help to keep the fire open, to keep down the cold air at the four corners, and to prevent the fire from falling through. When the fire-bars are too short, a few shovelfuls of broken bricks placed along the front or back of the box will greatly assist in remedying the deficiency."

The necessity for such use of fire-bricks would seem to be a very strong argument in favor of dead-plates around the sides of a fire-box. The direction that "the lumps of coal should be placed side by side, all around the box against the walls," would also seem to be confirmatory of this. The author also directs firemen to make and maintain the fire in a concave form, that is, keep it shallowest in the centre of the grate, and avoid what he calls the "haycock shape," which "is made by shoveling the coals into the middle of the fire-box." All these advantages of a concave fire may be obtained by the use of dead-plates around the sides and ends of the fire-box.

The secret of good firing, the author says, "is to fire frequently, a little at a time." It would be well if railroad companies had this engraved in the form of an illuminated text and hung up in the cabs of all their engines.

The directions for the inspection of engines are evidently suggested by the author's own experience. Thus nearly every locomotive runner, and especially every engine-house foreman, will recognize the truth of the following: "When the boiler is cold and the plug is out, the latter does not require to be screwed in so frightfully tight, because when the boiler is warmed up it expands and closes on the plug, and therefore a plug put in tight when the boiler is cold becomes still tighter when the boiler is hot."

The book is, however, marred by one great fault; the author seems all through to have a constant propensity to fall into fine writing. Thus, on page 125, there is the following sentence: "Be it known that self-reliance is a grand element of character. It has won Olympic crowns and Isthmian laurels; it confers kinship with men who have vindicated their divine right to be held in the world's memory." This and other similar sentences would seem to be quite too highly spiced for the intellectual palates of the readers of such a book. In fact, if this kind of matter and a good many common-place reflections were excluded, the book might be reduced very materially in size, which is always an advantage, provided, as in this case, nothing was lost by such reduction. The author, when he writes about the management of locomotives, always says something worth knowing, but when he allows his pen to run into rhetoric he ceases to be either interesting or instructive.

The granting of certificates to firemen and locomotive runners before permitting them to engage in those occupations has been a favorite idea with many persons, including the author of the book we are reviewing. Most experienced men, however, soon learn that very little can be known of a man's capacity for doing things by a mere oral or written examination. Some one has said that by playing whist with a candidate, he could tell something about his capacity, but he could learn very little by asking him questions. There are undoubtedly some things which a man who is to have charge of a locomotive should know, and the knowledge of which could be determined by a mere oral examination, but it is hard to tell whether a person is courageous, cautious, persistent and observant, by questioning him. When a man has run a locomotive a certain number of miles satisfactorily, and has sufficient knowledge of "reading," "riting" and "rithmetic," it would be just to give him a certificate to that effect, and in practice that is done now by letters stating such facts. It is true that before a man should be trusted with the care of a locomotive he should have a certain amount of experience and special knowledge, but if he was obliged to have a certificate from some one besides, it would then be in the power of those authorized to grant such certificates to exclude any they might choose from engaging in such occupation: a power which might be used very unjustly at times. The author has proposed a system of certificates and an elaborate course of examination for candidates.

Similar examinations are now made on many roads, but to make the possession of a certificate obligatory might work more evil than good to both the men and their employers.

The latter part of the book contains chapters on the indicator, hydrostatics, pneumatics, combustion, arithmetic, signals and regulations to be observed while running. Some of these are quite inadequate to convey the information which a locomotive runner should have of these subjects, and it would seem as if the object aimed at by the author could have been accomplished better by referring his readers to some elementary book on arithmetic than it is by devoting thirty pages to that subject.

The author is evidently much more accustomed to the care of locomotives than to the writing of books, and although he has contributed much useful information, it is to be regretted that Mr. D. K. Clark, who revised the book, did not exercise the privilege of excluding some things which are of little or no value, and suggesting the addition of others, which the experience and the position of the author would have enabled him to make plain to his readers.

Railroads: Their Origin and Problems. By Charles Francis Adams, Jr., New York, G. P. Putnam's Sons.

Mr. Adams' new book is a neat little volume of more than

200 pages, which will be found intensely interesting to every railroad man and indeed to nearly everyone else who reads. The most attractive portion is the first part, of some 90 pages, on the "Genesis of Railroads," and this is very largely made up of contemporary accounts of the opening of the Liverpool & Manchester and of several early American railroads. Mr. Adams speaks of the former event as one of the most dramatic events in the world's history, and the account of it which he presents, in letters and reports made by eye-witnesses, does justice to this character. It is absolutely exciting in its interest, and will attract the duller. The fiftieth anniversary of this event is now close at hand, and we can imagine nothing better to recall the circumstances of this beginning of railroad history. A large part of it is from the reminiscences of Fanny Kemble, which that lady contributed to the *Atlantic Monthly* two or three years ago, and which many of our readers will doubtless remember. The accounts of the beginnings of early American railroads are less interesting but more valuable, as the information given is not easily accessible. We note especially Mr. Adams' disclaimer of credit to Massachusetts for the first railroad. The "Granite Railway," usually referred to as the first American railroad, was really nothing more than a tramway, such as have existed for more than a hundred years in England, and it is but a few years ago that it became a true railroad, worked by steam.

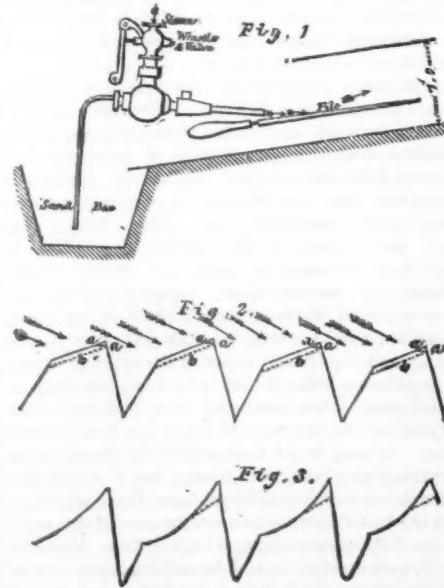
To railroad students the second and larger part of Mr. Adams' book, "The Railroad Problem," will have most value. Everything which he says on the subject commands attention from the public as well as railroad men; and it is fortunate for the railroads that a man so independent of popular prejudice has the popular ear. Whatever faults Mr. Adams may have, that of currying favor, either among those who complain of the railroads or among railroad managers, is not among them. He is not apt to be complimentary either way; but he accepts facts and results, and does not seem inclined to trouble himself about the path by which a desirable end is reached, if only it is reached.

There is not a great deal that is wholly new in this book. Part of that on the "Genesis of Railroads" has been published before, we believe; and much of that on the "Railroad Problem" was given in the last report of the Massachusetts Railroad Commission. It is here more fully developed, and the author's position with regard to combinations, consolidations and monopolies is very clearly put, as those who read the selections from it in our last issue will remember. The illustrations from the history of European railroad systems would have been better if more definite; but it is extremely difficult to give a concise statement of the actual railroad policy of foreign countries in the absence of a full history showing the successive stages of railroad politics in the different countries, and we find foreigners continually making grave mistakes as to the position of railroad affairs in adjoining countries with which they have constant relations. Especially is it difficult to understand the *rationale* of things without knowing the previous history from which the present order resulted.

We hope this book will have a wide general circulation, as it will serve to open the eyes of the public to some facts of prime importance in the economy of railroads which it is strongly indisposed to accept. Railroad men will hardly need to have it recommended to them; but we may repeat that they will find it extremely entertaining as well as useful.

Sharpening Files.

Mr. B. C. Tilghman has recently discovered another and very interesting application of the sand blast to industrial purposes. He has found that by subjecting worn files to the action of the jet, the cutting edges are rapidly renewed, and the file is made sharper than when new. The process is as follows: A stream of fine sand impelled at a high velocity by a jet of steam is applied to a file in the manner shown in



the sketch, fig. 1, at an angle of from 10 deg. to 15 deg. from its face; the file being moved about so that all parts may be acted on. The sand for the purpose is very fine grit prepared by washing and settling. It is used in the state of very soft slime drawn from a receiver, as shown in the sketch.

The effect upon the teeth of a file which has become dull

by wear, is to grind away some of the metal from the inclined sides of the teeth so as to reproduce a cutting edge, as shown by fig. 2. In this sketch the lines *a a* show the flat surfaces produced by wear on the points of the teeth; the dotted lines *b b* show the new surfaces produced by the grinding action of the sand, and the new cutting edges produced where the surface meets the vertical sides of the teeth.

The bottom diagram, fig. 3, shows the action of the blast on a new file. In this case it removes the burr on each tooth, bringing it to a much sharper edge.

A comparative trial of the cutting power of the sharpened files was lately made with the following results: A piece of soft wrought iron was filed clean and weighed; 1,200 strokes were made by a skilled workman with one side of a new 10 in. bastard file, the iron was again weighed, and the loss noted. The other side of this file was then subjected to the sand-blast for five seconds, and 1,200 strokes were made with this sand-blasted side on the same piece of iron, great care being taken to give strokes of equal length and pressure in both cases. The iron was then weighed, and the loss found to be double as much as in the first case.

These operations were repeated many times, counting the strokes and weighing the metal each time, and the quantity cut was found to gradually become less for both sides as these became worn. When the weight of metal cut away by 1,200 strokes of the sand-blasted side was found to be no greater than had been cut by the first 1,200 strokes of the ordinary side when quite new, a second sand-blasting was applied to it for 10 seconds, and in the next 1,200 strokes its rate of cutting rose to nearly its first figure. When the cut made by the ordinary side of the file fell to about $\frac{1}{3}$ of its cut when new, it was considered by the workmen as worn out, and a new file of the same size and maker was used to continue the comparison with the one sand-blasted side: 83 sets of 1,200 strokes each, and 13 sand-blastings were made on the same side of this file, and in that time it cut as much metal as six ordinary sides. In 99,600 strokes it cut away 14 oz. avoirdupois of wrought iron, and 16.4 oz. of steel.

With an equal number of strokes its average rate of cutting was, on wrought iron, 50 per cent. greater than the average of the ordinary sides, and on steel 20 per cent. greater. As the teeth become more worn, the time of the application of the sand blast was lengthened up to one minute. After the thirteenth re-sharpening its rate of cutting was nine-tenths that of the ordinary side when quite new.

When the teeth become so much worn that the sand blast ceases to sharpen them effectively, the file can be recut in the usual way, and each set of teeth can be made to do six times as much work as an ordinary file, and to do it with less time and labor, because it is done with edges constantly kept sharp. The time required to sharpen a worn-out 14-in. bastard file is about four minutes, or proportionately less if sharpened before being entirely worn out. Smooth files require much less time. About 4 horse-power of 60 lb. steam used during four minutes, and one pint per minute of sand (passed through a No. 120 sieve), and the time of a boy are the elements of cost of the operation.—*Engineering.*

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings.

Meetings will be held as follows:
Texas & Pacific, annual meeting, at the office in Philadelphia, Aug. 13, at 2 p. m.

Dividends.

Dividends have been declared as follows:
Illinois Central, 3 per cent., semi-annual, payable Sept. 2. Transfer books closed from Aug. 14 to Sept. 5. The company paid 3 per cent. in March, but the September dividend last year was only 2 per cent.

Cleveland & Pittsburgh (leased to Pennsylvania Company), 1 $\frac{1}{2}$ per cent., quarterly, payable Sept. 2.

United States Rolling Stock Company, the usual semi-annual dividend of 8 shillings sterling (2 per cent. gold) per share, payable Sept. 1, on its outstanding capital of \$5,000,000.

Railroad Conventions.

The *Traveling Passenger and Advertising Agents' Association* will hold its sixth annual convention at the Gibson House, Cincinnati, beginning Sept. 4, at noon.

The *General Ticket and Passenger Agents' Association* will hold its regular semi-annual meeting in Chicago, Sept. 13.

The *General Time Convention* will hold its fall session at the Grand Pacific Hotel, Chicago, Oct. 10.

The *Railroad Claim Agents' Association* will meet at the Planters' Hotel, St. Louis, Oct. 15.

The *Southern Time Convention* will hold its fall session at the Windsor Hotel, New York City, Oct. 17.

Foreclosure Sales.

The *New Jersey West Line* road was sold in Newark, N. J., Aug. 3, under a decree of foreclosure granted by the Court of Chancery of New Jersey. The finished road and franchises were bought for \$50,000 by Mr. J. J. Flanagan, who also bought the equipment and other property at a nominal price. The road was intended to run from Jersey City to Bethlehem, Pa.; it is completed from Summit, N. J., to Bernardsville, 15 miles, and graded from Summit to Lyons Farms, near Newark. There are \$1,900,000 bonds outstanding; the chief owners were formerly the Beekman estate and Hon. Asa Packer, President of the Lehigh Valley Company, but Mr. Packer is said to have sold his bonds. Mr. Flanagan acted in the purchase for other parties, but declined to say who they were.

The sale of the *Nashua, Andover & Boston*, under execution has been postponed to Aug. 10.

The *European & North American Railway for Extension from St. John Westward*, otherwise known as the *New Brunswick Division of the European & North American* road, will be sold at St. John, N. B., Aug. 31, under foreclosure of the first mortgage of \$2,000,000. The road is 91 $\frac{1}{2}$ miles long, from St. John, N. B., to Vanceboro. In 1872 it was consolidated with the *European & North American* Company of Maine, but the consolidation was broken up by the foreclosure suits under the separate mortgages. The bonds are chiefly held in England, and the bondholders have already made arrangements to buy the road and organize the *St. John & Maine Railway Company*.

ELECTIONS AND APPOINTMENTS.

Chicago, Rockford & Northern.—The United States Circuit Court in Chicago has appointed Otis R. Glover Receiver, in a suit to foreclose the second mortgage.

Delaware & Chesapeake.—The bondholders who bought the Maryland & Delaware road at foreclosure sale met in Easton, Md., July 31, and organized this company by electing the following directors: Ex-Gov. James B. Groom,

Samuel Hambleton, Edward Lloyd, Samuel Wetherill, Dr. E. M. Hardcastle, of Maryland; Wm. Slaughter, of Delaware; Samuel W. Bates, C. W. Huntington, Wm. T. Hart, Boston. The board elected officers as follows: President, Wm. T. Hart; Secretary and Treasurer, John W. Scott; Superintendent, John L. Caldwell. Offices at Easton, Md.

Denver & Rio Grande.—Mr. Nathaniel W. Sample has been appointed Master Mechanic, in place of John Greenwood, resigned.

Des Moines & Western Midland.—The officers of this new company are: President, A. Kirkpatrick, Richland, Ia.; Vice-President, H. Bedding, Dodge, Ia.; Secretary, John Warford, Minburn, Ia.; Chief Engineer, Charles J. Moore, Des Moines, Ia.

Kansas City & Eastern.—Mr. G. W. Vaughn has been appointed Superintendent, in place of L. O. Swope. Mr. Vaughn formerly held the same position.

Lafayette, Bloomington & Mississippi.—Mr. B. F. Morse has been appointed Purchasing Agent.

Lafayette, Muncie & Bloomington.—Mr. B. F. Morse has been appointed Purchasing Agent.

Middlesex Central.—At the annual meeting in Boston, July 31, the following directors were chosen: Wm. H. Hill, Jr., S. W. Richardson, George Keyes, Nathan Cushing, Jacob Edwards, Nathan Carruth. The road is leased to the Boston & Lowell.

Missouri & Western.—Mr. Alexander Graydon has been appointed Auditor and Assistant Treasurer.

New York, Lake Erie & Western.—Monthly reports of ticket sales should be sent hereafter to O. W. Cooke, Auditor of Passenger Receipts, New York.

Pennsylvania Company.—R. H. Rubie, late agent at Pittsburgh, has been appointed General Agent for the Pittsburgh, Fort Wayne & Chicago, New Castle and Lawrence branches.

Philadelphia & Atlantic City.—The organization under the Receiver is as follows: Charles R. Colwell, Receiver and President; Samuel R. Richards, Assistant President; Frank S. Urie, Secretary and Treasurer; J. S. Verts, Assistant Superintendent; Robert Gatzmer, General Passenger Agent; G. L. Poole, General Freight Agent; J. E. Lonebaugh, Excursion Agent.

Port Royal.—W. H. Johnson, Treasurer, is appointed Auditor also, in place of C. R. Abbott, resigned.

Runford Falls & Buckfield.—Mr. S. T. Corser is Superintendent.

Rutland.—At the annual meeting in Rutland, Vt., July 31, the following directors were chosen: E. A. Birchard, Jacob Edwards, George W. Gill, James W. Hickox, Edward S. Mosely, John B. Page, John Prout, James H. Williams, James S. Whitney. The board re-elected John B. Page, President; James H. Williams, Clerk. The road is leased to the Central Vermont.

St. Louis & Northwestern.—The officers of this company are: President, Dr. J. T. Beebe, Afton, Ia.; Vice-President, J. J. Harden, Gallatin, Mo.; Engineer, H. A. Miller.

Sioux City & Pacific.—Mr. F. C. Hills, General Passenger and Freight Agent, has removed his office from Sioux City to Missouri Valley, Ia.

Southern Pacific.—The board has elected Charles Crocker, President; David D. Colton, Vice-President; J. L. Willcutt, Secretary; S. T. Smith, Treasurer.

Springfield, Athol & Northeastern.—At the annual meeting in Springfield, Mass., Aug. 6, the following directors were chosen: Willis Phelps, Homer Foot, William Birnie, Charles R. Ladd, Springfield, Mass.; W. B. Kimball, Edward Smith, Enfield, Mass.; J. C. Hill, T. H. Goodspeed, Athol, Mass.; J. W. Goodman, North Dana, Mass.; S. P. Bailey, Greenwich, Mass.; R. H. Allen, Prescott, Mass. The board re-elected Willis Phelps President; Edward Smith, Vice-President; T. H. Goodspeed, Secretary and Treasurer.

Springfield & Northwestern.—Mr. George N. Black, of Springfield, Ill., has been appointed General Manager. He has been connected with the road several years and was recently receiver. Mr. Charles Hamilton has been appointed General Superintendent and Engineer; he has been connected as Engineer with the Rock Island road, the Rockford, Rock Island & St. Louis and other roads, and was at one time Superintendent of the Cairo & St. Louis, and has been recently Chief Engineer to the Illinois Board of Railroad and Warehouse Commissioners.

Toledo & Ann Arbor.—The officers of this new road are: President, Dr. J. M. Ashley; Secretary, A. W. Hamilton; Superintendent, J. S. Morris; General Freight and Ticket Agent, G. W. Layng; Auditor and Paymaster, B. F. Jarvis. All the officers are at Toledo, O., except the Secretary, who is at Ann Arbor, Mich.

Troy & Greenfield.—This company, which still keeps up its organization, though the road has been owned by the State of Massachusetts for years, last week elected Edward Appleton, of Boston, President, and F. L. Chapman, of Cambridge, Mass., Clerk and Treasurer.

Utah & Northern.—The officers of this company (successor to the Utah Northern) are: S. H. Clark, President; J. W. Gannett, Secretary and Treasurer; G. W. Thatcher, Superintendent; Thomas L. Kimball, General Passenger and Ticket Agent; E. P. Vining, General Freight Agent; N. Shelton, Cashier. The Superintendent has his office at Logan, Utah; all the other officers are at Omaha, Neb., and they are officers of the Union Pacific also.

Vermont Valley.—Mr. John Mulligan has been appointed Superintendent. He is also Superintendent of the Connecticut River Railroad, and his office will continue to be at Springfield, Mass.

Waynesburg & Washington.—Mr. J. G. Ritchie has been chosen President and Superintendent. Office at Washington, Pa.

Wilmington & Northern.—Mr. D. R. Bennett has been chosen President, relieving Mr. E. G. Buckley, who has been President *pro tem.* since the death of Mr. Robert Frazer.

Wisconsin Central.—Mr. James Barker is appointed Auditor, and will also have charge of the Ticket and Passenger departments until further notice. He succeeds Henry Pratt, resigned.

PERSONAL.

—The firm of R. M. Bishop & Co., in Cincinnati, suspended payment Aug. 3, the liabilities being about \$300,000. Hon. R. M. Bishop, head of the firm, is Governor of Ohio and also a trustee of the Cincinnati Southern Railroad.

—Mr. James Mullin, who died in Reading, Pa., July 31, aged 60 years, was formerly foreman of the Reading Rail-

road blacksmith shops in Reading, and for some years had charge of the steam forge of the Seyfert & McManus Company. He retired from active work some years ago, with the reputation of being the best hammer-smith in the country.

—Gen. A. L. Roumfort, who died in Harrisburg, Pa., Aug. 2, aged 81 years, was born in France, but came to America when a child and graduated at West Point in 1817. He served in the army a few years and then became principal of a school, near Philadelphia. He held several local offices and finally was appointed Superintendent of Motive Power on the Philadelphia & Columbia road, then owned by the State. When the road was sold to the Pennsylvania Railroad Company he was appointed Superintendent of the Eastern Division, and held that position until 1862. Since then General Roumfort has lived in retirement, except four years, when he was Mayor of Harrisburg.

—Sidney W. Hopkins, an iron merchant in New York, and at one time Treasurer of the Chicago & Lake Huron Company, has filed a voluntary petition in bankruptcy.

—Hon. Frank Jones, President of the Portsmouth & Dover Company, has declined a renomination to Congress from the First New Hampshire District.

—Mr. Otis Kimball, a well-known railroad man, died in Boston, Aug. 1, aged 62 years. He had been at different times connected with the Erie road, General Passenger Agent of the Lake Shore, and General Manager of the Red Line. For some years past he has represented the Merchants' Dispatch in Boston.

—Mr. George S. Winslow, Purchasing Agent of the Burlington, Cedar Rapids & Northern road, and brother to General Manager Winslow, was killed suddenly near Cedar Valley, Ia., Aug. 2. He was riding in front of an engine when the pilot struck a bog, which was thrown up against Mr. Winslow, knocking him off. His head struck the end of a tie, crushing in his skull and killing him instantly.

TRAFFIC AND EARNINGS.

Railroad Earnings.

Earnings for various periods are reported as follows:

Seven months ending July 31:

	1878.	1877.	Inc. or Dec.	P. c.
Bur., Cedar Rapids & Northern.....	\$888,538	\$501,958	I.	\$386,580 77.0
Chi. & Alton.....	2,429,597	2,989,577	D.	59,980 2.4
Chi., Milwaukee & St. Paul.....	4,904,000	3,514,290	I.	1,389,710 39.5
Missouri, Kansas & Texas.....	1,475,684	1,684,056	D.	208,372 12.4
St. Louis, Iron Mt. & Southern.....	1,904,068	1,935,297	D.	30,629 1.6
St. Louis, Kan. City & Northern.....	1,747,775	1,604,844	I.	142,931 8.9
Wabash.....	2,561,273	2,359,108	I.	232,165 9.8

Six months ending June 30:

Atlantic, Miss. & Ohio.....	\$761,810	\$756,118	I.	\$5,692 0.8
Chi., Burlington & Quincy.....	6,417,790	5,472,047	I.	945,743 17.3
Net earnings.....	2,009,160	2,175,926	I.	490,234 22.5
P. c. of expenses.....	58.43	60.34	D.	1.79 3.0
Dakota Southern.....	103,730	103,730		
Kansas Pacific.....	1,447,534	1,346,045	I.	101,479 7.5
Net earnings.....	379,921	541,562	D.	161,641 29.8
P. c. of expenses.....	72.25	59.00	I.	12.65 21.2
Nash., Chat. & St. L.....	821,973	810,994	I.	10,979 1.4
St. Paul & Pacific Main Line.....	313,270	172,900	I.	140,271 81.1
St. Paul & Pacific Branch Line.....	194,354	119,523	I.	74,831 62.6
St. Paul & Sioux City.....	285,113	207,740	I.	77,373 37.3
Sioux City & St. Paul.....	179,764	113,528	I.	66,236 58.4
Wor. & Sioux Falls.....	44,318	6,768	I.	37,550 554.8

Three months ending June 30:

Chi., Rock Island & Pacific.....	\$2,041,182	\$1,715,583	I.	\$325,599 19.0
Month of June:				
At. Miss. & Ohio.....	\$120,094	\$128,000	D.	\$7,915 6.2
Chi., Burlington & Quincy.....	897,090	957,734	D.	60,644 5.3
Chi., R. I. & Pacific.....	568,217	536,234	I.	31,983 6.0
Dakota Southern.....	17,386			
Nash., Chat. & St. L.....	91,833	117,439	D.	25,606 21.8
St. Paul & Pacific.....	46,734	40,442	I.	6,292 15.6
St. Paul & Sioux City.....	29,954	21,450	I.	8,504 39.6

Month of July:

Bur., Cedar Rapids & Northern.....	95,007	73,309	I.	21,698 29.6
Chicago & Alton.....	435,255	305,917	I.	129,338 42.3
Chi., Milwaukee & St. Paul.....	648,000	555,610	I.	92,390 16.6
Missouri, Kansas & Texas.....	219,924	253,123	D.	33,199 13.1
St. Louis, Iron Mt. & Southern.....	290,200	277,120	I.	12,880 4.6
St. Louis, Kan. City & Northern.....	237,679	193,622	I.	44,057 22.8
Wabash.....	374,592	300,038	I.	74,554 24.8
Third week in July:				
St. Louis, Iron Mt. & Southern.....	\$78,900	\$84,185	D.	\$5,285 6.3
Week ending July 28:				
Gt. Western, of Can.....	\$78,904	\$66,804	I.	\$12,100 18.1
Week ending July 27:				
Grand Trunk.....	\$147,864	\$147,483	I.	\$381 0.3

Grain Movement.

Receipts and shipments of grain of all kinds, for the week ending July 27, are reported as follows, in bushels, for five years:

The receipts of the eight leading Northwestern markets have been:

	1878.	1877.	1876.	1875.	1874.
4,765,172	3,151,091	2,983,881	4,424,392	3,680,886	

The receipts this year are extraordinary for the season, the farmers being usually too much engaged in July to spend much time in carrying grain to market. There have been, indeed, but four weeks this year, which has been one generally of heavy grain movement, that the receipts of the Northwestern markets were larger than for the last week here reported; this is probably largely the effect of the artificially high prices from wheat in Chicago and Milwaukee effected by the "corner;" the July price being 10 or 15 cents per bushel more than the price offered in the same market for August delivery, the farmers had strong inducements to forward their grain. For the six weeks ending July 13 the average weekly receipts of grain at these markets this year were but 3,120,000 bushels; for the two weeks following they were 4,548,000 bushels.

The shipments of the above markets for the same week were:

	1878.	1877.	1876.	1875.	1874.
3,652,063	3,123,145	2,494,710	3,698,180	2,301,940	

The shipments for the week this year are the largest for six weeks, but they have not increased as the receipts have, and for the past two weeks, when the "corner" was likely to bring wheat to the lake cities and prevent the shipment of

it thence, the receipts exceeded the shipments by 2,350,000 bushels, or about 35 per cent.

Of the above total shipments from Northwestern markets the number of bushels and percentage of the total shipped by rail were as follows:

1878.	1877.	1876.	1875.	1874.
1,338,719	318,848	1,038,208	976,152	434,716
36.7 p. c.	10.2 p. c.	41.5 p. c.	26.4 p. c.	19.7 p. c.

The rail shipments this year have been exceptionally large for two weeks, but are very much smaller than in May.

The receipts for the same week at the seven Atlantic markets were:

1878.	1877.	1876.	1875.	1874.
5,003,895	2,013,274	2,621,248	2,287,218	2,808,327

It will be observed that the Atlantic receipts this year are enormous, and nearly twice as great as in any of the four years preceding. They are the largest this year since the first week of June, and are extraordinary for the season, and probably result by the extraordinary cause of an abundant winter wheat crop in the Ohio Valley, harvested so early that part of it could be marketed in time to take advantage of the July prices, which is very rarely possible. This is further indicated by the fact that there are large wheat receipts at Baltimore.

Of the Atlantic receipts this year, 44.3 per cent. arrived at New York, 22 at Baltimore, 12.7 at Philadelphia, 11 at Boston, 8.2 at Montreal, 1.6 at New Orleans and 0.2 at Portland. Baltimore's receipts are the largest on record for any single week, and are 60 per cent. greater than its average weekly receipts for the first half of this year.

Receipts and shipments at Chicago and Milwaukee for the week ending Aug. 5 were:

	Receipts.	Shipments.
Chicago.....	2,699,896	2,420,069
Milwaukee.....	243,200	260,329

Receipts and shipments at Buffalo were, by rail and by water:

	Receipts.	Shipments.
By rail.....	1,020,500	1,476,340
By water.....	1,460,045	782,419
Total.....	2,480,545	2,258,759

At four Atlantic ports the receipts for the same week were: New York, 3,081,736; Baltimore, 1,309,590; Philadelphia, 712,900; Boston, 549,600. Of the receipts at New York, 2,029,827 bushels, or 66 per cent., were by rail. The New York receipts are the largest for five weeks, and have been exceeded but twice this year, and the Baltimore receipts have never been exceeded, which for the first week in August is something remarkable. Six-sevenths of the Baltimore receipts, too, were wheat.

Receipts of flour and grain at Buffalo for July and the seven months ending July 31 are reported as follows by the Commercial Advertiser of that city:

	1878.	1877.
July:		
Flour, barrels.....	130,938	76,500
Grain, bushels.....	5,978,700	1,642,700

Season:

	1878.	1877.
Flour, barrels.....	408,826	338,600
Grain, bushels.....	10,263,357	16,355,100

The rail receipts this year for July were 36.8 per cent. of the flour and 21.6 per cent. of the grain; for the season, 45.3 per cent. of the flour and 35.1 per cent. of the grain. Shipments east of grain received by lake were, for the season:

	1878.	1877.	Increase.	P. c.
By canal, bushels.....	25,495,013	13,310,330	12,178,683	91.5
By rail.....	6,707,044	2,921,319	3,785,725	129.6
Totals.....	32,202,057	16,231,649	15,970,408	98.3
Per cent. by rail.....	20.8	18.1	2.7	14.9

The canal opened April 15 in 1878 and May 8 in 1877. The average shipments per day by canal were 237,719 bushels in 1878 and 156,653 in 1877; by rail they were 62,102 in 1878 and 34,367 in 1877.

Baltimore grain receipts for July were:

	1878.	1877.	Increase.	P. c.
Flour, barrels.....	99,430	48,894	50,536	103.3
Wheat, bushels.....	2,727,749	640,596	2,087,153	325.8
Corn.....	838,024	469,615	368,409	78.4
Other grain.....	95,122	48,095	47,027	97.7
Total grain.....	3,669,895	1,186,300	2,483,595	209.7
Total, flour reduced to bush. 4,158,045		1,426,776	2,731,269	191.4

For the seven months ending July 31 the receipts were:

	1878.	1877.	Increase.	P. c.
Flour, barrels.....	701,008	605,513	95,495	15.8
Grain, bushels.....	21,670,162	17,583,778	4,086,384	23.2
Total, bushels.....	25,175,202	20,611,343	4,563,859	22.1

Exports for July were 44,045 barrels flour, 1,391,621 bushels wheat, 1,151,931 bushels corn and 8,558 bushels other grain.

Coal Movement.

Coal tonnages for the week ending July 27 are reported as follows:

	1878.	1877.	Increase.	P. c.
Anthracite.....	468,918	293,800	175,118	59.6
Semi-bituminous.....	78,092
Bituminous, Pennsylv'a.....	26,375

Coal shipments from Pictou, N. S., up to the end of July were 50,902 tons.

The Philadelphia & Reading Company has issued a circular to the effect that, after Aug. 5, and until further notice, a drawback of 35 cents, in addition to those provided by existing circulars, will be paid on all anthracite coal shipped by way of the Schuylkill Canal, or from Port Richmond to New York, or through the Delaware & Raritan Canal. This change is made to equalize the rates to New York with those on the Lehigh Valley Railroad. This, it is said, does not influence the price of coal in New York.

The anthracite coal tonnage of the Belvidere Division, Pennsylvania Railroad, for the seven months ending Aug. 3 was:

	1878.	1877.	Inc. or Dec.	P. c.
Coal Port for shipment.....	2,947	12,286	D. 9,339	75.9
South Amboy for shipment.....	286,321	350,963	D. 64,642	18.4
Local distribution on N. J. lines.....	96,541	98,318	D. 1,777	1.8
Company's use on N. J. lines.....	46,497	42,593	I. 3,904	9.1
Total.....	432,276	504,160	D. 71,884	14.3

Of the total this year 335,181 tons were from the Lehigh and 95,095 tons from the Wyoming Region.

Live Stock Rates.

A meeting of representatives of the Trunk and Western lines was held at Long Branch, Aug. 7. Sixteen roads were represented, but neither the Baltimore & Ohio nor the Grand Trunk were present. The meeting was held chiefly to consider the cutting of live-stock rates from St. Louis. After a preliminary session, an opportunity was given to the roads directly interested to settle the matter among themselves. They were unable to agree, however, and the Eastern roads, it is said, finally took the matter in hand and

decided that they would not countenance the cutting of rates. It was finally decided to fix rates temporarily on live stock at 60 cents from Chicago and 65 from St. Louis to New York, with the usual differences to Baltimore, Philadelphia and Boston. The conference then adjourned to meet in Saratoga, Aug. 20.

East-Bound Rates.

The tariff of Aug. 5 differs from that of May 17 in none of the three upper classes, which are 120 and 90 and 70 cents per 100 lbs., respectively, from Chicago to New York, and are materially lower than were ever made on these freights before last Spring. The other leading rates were, by the two tariffs:

	May 17.	Aug. 5.
Fourth class.....	25	30
Grain in car-loads.....	20	25
Flour, per barrel.....	40	50
Boxed meats.....	20	30
Bulk meats.....	25	35
Beef, pork, lard, lard oil, tallow, stearine, hams, shoulders or grease, in barrels or tierces.....	20	30
Dressed hogs, beef and mutton.....	75	75
Dressed poultry, game and pork tenderloins.....	70	70
Cheese.....	40	50
Grass and clover seed.....	25	30

Thus the advance in provisions, which form a large proportion of the whole freight, is generally 10 cents per 100 lbs. from the May rate. As everything but grain and such freights as the three upper classes, fresh meats and cheese—altogether a small proportion of the whole—was carried in July at 18 cents per 100 lbs., while grain was taken at 16 cents, the new rates are a very great advance on those which immediately preceded them. A car-load of provisions which in July was taken for \$36 now brings \$60—an advance of 66 2/3 per cent.

Water Rates.

The Buffalo Commercial Advertiser of Aug. 2 says: "Carriers by land and water earnestly hope that July, 1878, will enjoy the unenviable distinction of having the worst record in the history of our internal commerce. The average rates by lake and canal are the lowest ever known, and fore-shadow certain ruin to all engaged in the transportation business, if there is not an early improvement. The following statement, showing the average rates on wheat and corn from Chicago to Buffalo by lake, for July, and the average on the same cereals by canal to New York, in each of the years named, indicate unparalleled depression:

	LAKE.		CANAL.	
	Wheat.	Corn.	Wheat.	Corn.
Year.	Cts.	Cts.	Cts.	Cts.
1869.....	5.0	4.8	14.0	12.6
1870.....	5.0	4.7	9.4	9.2
1871.....	6.2	5.7	11.8	10.8
1872.....	9.6	8.8	12.0	10.0
1873.....	6.5	5.6	10.6	9.6
1874.....	3.1	2.1	9.0	8.0
1875.....	2.8	2.6	7.5	6.9
1876.....	1.9	1.7	5.9	5.4
1877.....	2.6	2.2	5.4	4.7
1878.....	1.7	1.5	4.3	3.8

"From these figures it will be seen that the average freight rate on wheat from Chicago to New York for the entire month, was only 6 1/2 cents. Add to this the transfer, or elevator charge here, of half a cent, and it makes the average through rate for carrying sixty pounds fifteen hundred miles, only seven cents. It is scarcely necessary to say that there is no money in this for anybody.

"But this is not the worst feature of the case. The railways have been doing the work for less than the water route. Their published rates were higher, but the schedule was only for the uninitiated. Regular shippers could get rebates amounting to about as much as the freight actually paid in. The fact that the railways have recently been carrying more grain than the water route clearly indicates that they have been underbidding the vessel men.

"Now, it is generally admitted that large vessels can carry grain at less cost than the railways possibly can under present circumstances. If that is the case, and if the vessels have not come out whole on the month's grain business, where must the railways be, having received less and paid more for the work? The only answer is they have lost heavily. Where this will lead to is shown by the railway statement for the first half of the year, which reports foreclosures and receiverships involving \$300,000,000 of railway property. The most astonishing part of the business is that the roads persisted in cutting rates when they might have had nearly as much trade as they did secure, at remunerative rates. But the struggle for the last fraction was what carried freights down so low."

Erie Canal.

The business of the canal at Buffalo from the opening up to July 31 was as follows:

	1878.	1877.	Increase.	P. c.
Boats cleared.....	3,708	2,318	1,390	60.0
Tons received.....	\$254,829	\$150,771	\$104,058	69.0
Average receipts per day.....	2,382	1,705	587	32.7

The canal opened April 15 in 1878 and May 8 in 1877, the report including 108 days this year, against 85 in 1877.

Norfolk Cotton Business.

Cotton receipts at Norfolk, Va., for July were 2,199 bales, a decrease of 132 bales, or 6 per cent. from 1877. For the eleven months of the cotton year from Sept. 1 to July 31 the receipts were, in bales:

	1877-78.	1876-77.	Inc. or Dec.	P. c.
At. Miss. & Ohio R. R.....	217,924	216,929	I. 995	0.5
Seaboard & Roanoke R. R.....	168,683	248,162	D. 79,479	32.0
Canals and otherwise.....	41,563	40,836	I. 727	1.8
Total.....	428,170	505,927	D. 77,757	15.4

Of the receipts this year 188,575 bales were local, consigned to Norfolk and 239,595 bales were through cotton for other points.

Delaware Fruit Traffic.

As expected, the peach shipments from Delaware and the Eastern Shore are this year extremely small. Up to Aug. 6 only 60 car-loads of peaches had passed through Wilmington on the Delaware Railroad, when in an average season the shipments should now be some 60 cars a day. There will be a serious loss of revenue to the railroads, which will not injure the Delaware road much, as its deficiencies are made up by the lessee. The branch lines, however, may be seriously embarrassed by the loss of what is usually their largest item of traffic.

Petroleum Shipments by Canal.

Five boat-loads of petroleum, 1,910,900 gallons in all, arrived in New York, Aug. 7, coming from Buffalo by the Erie Canal and Hudson River. Twelve more boats are reported on the way. These are the first shipments of oil made by canal, and were consigned to John J. Gibbons & Co. The oil was carried to Buffalo by the McKean & Buffalo and Buffalo, New York & Philadelphia roads. It is carried in iron tanks placed on the boats.

RAILROAD LAW.

Internal Revenue Tax on Bonds Held Abroad.

The United States Supreme Court last week gave its decision in the case of the United States against the Erie Railway Company. As reported in the Washington dispatches it is as follows: "The suit was brought for the recovery of a tax on interest paid in London on sterling bonds issued by the Erie Company. The issues were for £1,200,000 sterling; the first made during the continuance of the Act of Congress of 1864, and the second subsequent to the passage of the Act of 1866. The latter act provided for the taxation of interest paid on securities negotiated abroad, and it is said that this decision in effect declares the Act of 1866 unconstitutional and void. The Chief Justice held that the tax for the recovery of which this suit was brought was a tax upon the owner of the bond and not upon the defendant, was not upon the bond itself but upon the income of the owner of the bond; that the foreign owner was not subject to the jurisdiction of the United States nor this portion of his income. The debtor of the foreign owner and his debtor's money were within this jurisdiction, but the money of his debtor did not become a part of his income until it was paid to him, and in this case the payment was outside the United States, in accordance with the obligations of the contract which he held. The default of the defendant in making its returns was a continuing one. Only one penalty, therefore, was recoverable. The judgment of the District Court was affirmed."

Suits Under the Former Wisconsin Railroad Law.

A dispatch from Milwaukee, Aug. 1, to the Chicago Tribune says: "In the important case of Streeter vs. the Chicago, Milwaukee & St. Paul Railway Company, which is a suit under the late Potter law of this State to recover three times the amount of overcharge above legal rates for the transportation of lumber from Fond du Lac to Oconomowoc, where the plaintiff resides and was doing business as a lumber merchant, the State Supreme Court, on appeal from the Waukesha Circuit, decide finally that in a suit for such damages, after the repeal of the law fixing such rates, the plaintiff cannot recover, the saving clause of the repealing act (the Vance railroad law, so-called) being insufficient in its language to preserve the rights of the plaintiff under the law. Neither can the plaintiff, without an amendment to his complaint, recover, as in a common law action, for the simple excess of such overcharges above reasonable rates. This decision sweeps away all the civil cases for damages pending against the railroad companies for violations of the Potter law in overcharges for freight and passenger fares."

Directors as Officers of Companies.

In Holder vs. The Lafayette, etc., Railway Company (22 American Reports, 89; s. c., 71 Ill., 106) the Court held that where a director is chosen treasurer, or to another such office, he is not entitled to compensation except it be fixed before performance of the services; though the rule, the Court concedes, ought to be limited to directors and persons connected with the directory.—New York Register.

THE SCRAP HEAP.

Railroad Manufactures.

Richmond, Backus & Co., at Detroit, manufacturers of the Ayers patent ticket case, recently made for the Pennsylvania Railroad Company one of the largest ticket cases ever manufactured. It is 20 ft. by 8 ft., and holds 3,000 different forms of tickets.

The Eclipse Wind-Mill Co., of Beloit, Wis., last week received an order for five of its mills from a railroad contractor of Moscow, Russia, who intends to introduce them on Russian roads for water supply. A number of the company's wind-mills are now being loaded on the ship Memnon, bound for Sidney, Australia. Since the Centennial the company has secured a large export trade, extending to the English colonies, Germany, Spain, Austria, Cuba and South America. The company is represented at Paris.

The Pennsylvania Railroad shops at Altoona, Pa., are running to their full capacity. Besides the work of the road, the car shops are building some passenger and a large number of freight cars for the Pennsylvania Company, to be used on the Fort Wayne and Pan Handle roads.

The Gaysport Machine Works, at Gaysport, Blair County, Pa., are building a street car motor of a pattern designed by Gen. J. D. Imboden, of Richmond, Va.

The charcoal blast furnace at Oswego, Clackamas County, Oregon, recently went into blast after about a year's rest. It makes 10 tons of pig iron a day, and is the only blast furnace on the Pacific Coast.

The Crowther Iron Co., of New Castle, Pa., has filed a voluntary petition in bankruptcy. The liabilities are \$160,000; assets, a blast furnace and real estate valued at \$165,000.

The Danforth Locomotive Works, at Paterson, N. J., are building some engines for the Brooklyn, Flatbush & Coney Island road.

The report that the New York, Lake Erie & Western Company had awarded the contract for 30 consolidation engines to the Grant Locomotive Works, at Paterson, N. J., is confirmed. The bid of the Grant Works was the lowest; the price is not made public, but is said to have been very low.

The schedule in bankruptcy of the Pittsburgh iron firm of Reese, Graff & Woods was filed Aug. 5. The liabilities are \$1,171,905, of which \$602,643 are secured. The assets are valued at \$600,000 and consist of real estate, steel and iron in stock and outstanding accounts.

Bridge Notes.

The Niagara Bridge Co., of Buffalo, N. Y., has just completed an iron bridge of 205 ft. span at Satan's Kingdom, Conn., on the Connecticut Western road. The bridge has been tested and accepted.

Cofrode & Saylor, of the Philadelphia Bridge Works, have completed the erection of the iron viaducts at Elkhorn, Black's and Logstown runs on the new Pittsburgh & Lake Erie Railroad. They are now putting up another iron viaduct, 260 ft. long, at Scott's Run, and one 300 ft. long at Strahan Run on the same road.

The American Bridge Co., of Chicago, has the contract for the iron superstructure of the First avenue viaduct in Milwaukee.

The Morse Bridge Co., of Youngstown, O., has a contract for an iron highway bridge over the Naugatuck River, at Wolcottville, Conn.

M. Lassic, of Chicago, is building two combination spans, 105 ft. each, over the Zumbro River, on the Rochester & Northern Minnesota road.

Horace E. Horton, of Rochester, Minn., has been awarded the contract for a Pratt truss combination highway bridge at St. Cloud, Minn., the contract price being \$9,000.

Notes.

The London papers are delighted at a new arrangement made by the London, Brighton & South Coast Company in England, by which boys are posted at certain stations who will supply travelers with ice-water at a penny a glass. This does not seem like a very great boon to us, who are accustomed to see a water-cooler in every car, but in England it is hailed as a great advance.

An exchange says that the cottonwood poles used on the

line of the Southern Pacific Railroad to support the telegraph wires have sprouted and give promise of supplying a continuous line of flourishing shade trees.

The Burlington *Hawkeye* is responsible for the statement that the Burlington, Cedar Rapids & Northern Company furnished all the passengers on one of its trains with smoked glasses, through which they could look at the eclipse of the sun the other day. The company was bound not to be excelled by any other line in accommodations furnished to passengers.

Railroads have a great fascination for deaf and dumb men and for drunken men. The deaf man invariably takes his morning walk on the track, and a drunken man is perfectly happy when he can find a rail for a pillow.—*Stanford (Ky.) Interior Journal*.

A Ghost on a Railroad.

San Mateo, Cal., is just now worried by a ghost, which appears on the Southern Pacific track near the town. It has the appearance of a man, and allows itself to be run over by the cars and shot at with the utmost unconcern, disappearing when apparently struck. Opinions are divided, some people regarding it as a genuine ghost, while others think that it is an ingenious scare-crow or illusion to frighten away the local "hoodlums" from the orchard belonging to Alvin Hayward, which borders on the railroad just where the ghost is generally seen.

Train Struck by Lightning.

The Springfield (Mass.) *Republican* of Aug. 3 says: "The 6:10 p. m. express from Boston was struck by lightning yesterday afternoon on the Charlton grade, and narrowly escaped disaster. The bolt struck the engine by the right cylinder, enveloping the whole machine in an electric flame, knocking the fireman, Flaherty, partially insensible and for a moment disabling Osgood, the engineer, whipping his hand off the throttle and nearly blinding him. The tender was sent several inches into the air, but reached the track again all right, and the whole train was jolted as though off the track. The passengers' hair stood on end for several minutes but none were hurt."

Cheap Bonds.

In New York, Aug. 7, at auction, certificates for \$25,000 New York & Oswego Midland Western Extension bonds sold for \$280. New York & Oswego Midland Equipment and convertible bonds sold at 25 cents per \$500 bond and 60 cents per \$1,000 bond. New Jersey Midland consolidated (third) mortgage bonds brought \$6.50 per \$1,000 bond. Twenty-five cents for an elegantly engraved bond is certainly dirt cheap.

Proposals for Iron Beams.

Major D. W. Flagler, United States Ordnance Corps, will receive at the Rock Island Arsenal, Ill., proposals to be opened Aug. 30 for about 1,643,000 lbs. of 15-in. wrought-iron I beams, to weigh 200 lbs. per yard; about 754,000 lbs. of 12 or 12½-in. wrought-iron I beams, to weigh 125 lbs. per yard; and about 8,100 lbs. of angle pieces, 3½ by 3½ by ½-in. The proposals must be for the beams delivered on cars at the arsenal, and about one-fifth of the quantity will be required within two months, the balance within five months. The beams must be straight, out of wind, cut square at the ends, free from flaws, blisters, and ragged edges, and of good iron. Bids must be accompanied by the manufacturers' tables of formula, giving guaranteed strength and stiffness. Nearly all the beams will be required in lengths of from 16 to 20 ft., and two-thirds of them in such exact lengths that they must be cut cold.

A Railroad Velocipede.

The Pittsburgh *Telegraph* of Aug. 5 says: "The publishers of the *Sunday Leader*, experiencing great difficulty in delivering their papers to the towns located on the various railroads, on which no Sunday trains are run, have purchased a device which, for want of a better name, may be called a 'Speeder.' It consists of a light open framework bed, suspended on four wheels; the two front ones being 24 in. in diameter, purposely made small in order to prevent the machine from jumping the track on curves; the two rear wheels, being the 'drivers,' are four feet in diameter, and are made as large as possible in order to obtain the greatest possible speed. Parallel rods run on each side from the drivers to uprights, which are connected at the top by a strong cross-bar. The man sits almost over the rear axle, his feet resting against a foot-board over the front axle; he faces consequently to the front and pulls or pushes on the cross-bar very much the same as one would do in rowing a boat. In this, it is claimed he utilizes his power to the best advantage. A powerful brake applies to the drivers which is worked by his foot, should an emergency arise. The papers are strapped to the framework on each side of the man. The machine was built by the Westinghouse Air Brake Company, of this city, and several tests were made of it on the tracks of the Allegheny Valley Railroad Company opposite their works on Liberty avenue. These demonstrated the facts that a speed of six or eight miles per hour could be reached, and that the brake would stop the device in 10 or 12 feet. It was shipped down to the junction of the Pittsburgh, Wheeling & Kentucky Railway with the Pittsburgh, Cincinnati & St. Louis Railway at Steubenville on last Saturday afternoon. It was only intended by its builders to carry one man and say 250 lbs. of newspapers; but at 2:30 o'clock on Sunday morning Messrs. W. H. Nevins, Lou Winans and the Wheeling agent of the *Sunday Leader*, started at full speed, into the darkness towards Wheeling, with about 160 lbs. of papers aboard. They reached Wheeling at exactly 5 o'clock, having run 26 miles in 2½ hours, or at average speed of over 10 miles per hour."

Government Contracts.

Lieutenant-Colonel Q. A. Gillmore, United States Engineers, will receive at his office, Army Building, New York, until Sept. 5, proposals for the construction of a submerged dam at the Cross Tides in the Savannah River, near Savannah, Ga. Blank forms, specifications, etc., can be had on application at the office in New York, or until Aug. 26 to Captain James C. Post, at Savannah.

Prices of Rails.

The *Engineering and Mining Journal* says: "The prices of Bessemer rails are not nearly so strong as a month or two ago, and the outlook for the balance of the year is not so encouraging, although this branch of the iron trade is better than any other. We quote steel rails at mills at \$41.50 to \$44, according to quantity and delivery, and iron rails \$32 to \$36."

OLD AND NEW ROADS.

Brooklyn, Flatbush & Coney Island.—This company, having completed its connection with the Long Island road at Franklin avenue in Brooklyn, has arranged to run its trains over the Long Island track, both to its Brooklyn terminus at Flatbush avenue, and also to the East River terminus at Hunter's Point, there connecting with the ferries to New York. An extension of the road is proposed to connect

with the Southern road, which will shorten the line to Hunter's Point.

Canadian Pacific.—The contract for the construction of the Georgian Bay Branch, from Nipissing to French River, 50 miles, has been let to Henry, Charlebois & Flood, whose bid was \$808,800.

Central Pacific.—The track on the San Pablo & Tulare road, which is owned by this company, and forms part of the new loop line from Bantas to Oakland, is now laid from Martinez, Cal., east five miles, and from the old terminus at Antioch west to the Pittsburgh Railroad crossing, about 15 miles, leaving only about 10 miles to finish the road. It is expected that the track will all be down by Sept. 1, though it may take some time longer to finish the ballasting and make the road ready for trains.

The company has lately completed in its shops at Sacramento some cars for use on its Oakland local trains, which are thus described by the *San Francisco Evening Post*: "These cars are 12 in number, and being made expressly for local travel, differ materially in construction from the ordinary passenger car. They are one foot lower than other cars, being but two steps from the ground to the platform, and the wheels are railed in with an iron fender, which renders it impossible for any person to get underneath them. The steps are made so that persons cannot get their feet through between them. The interior is tastefully arranged, and is finished with prima vera wood and California laurel. The seats are not cushioned, and are arranged so that the passengers sit facing each other. They are stationary, and will work a hardship on the hoodlum, who has heretofore taken a malicious pleasure in throwing the seats so violently over as to break them. Each car has a seating capacity of 80. A signal rope is also in place, so that any one perceiving danger can stop the train at once by the air brakes. The baggage car is arranged with accommodations for conductor, baggage man and mail clerk."

D. D. Colton and S. W. Sanderson, trustees under the land mortgage of the company dated Oct. 1, 1870, give notice they hold \$1,100,000 gold, to be used in the redemption of bonds, according to the terms of the mortgage. They will receive sealed bids for the sale to them of bonds issued under the mortgage at their office, Fourth and Sanderson streets, San Francisco, until Aug. 28.

Chicago & Atlantic.—Meetings are being held along the line in aid of this road, which is the Indiana section of the projected narrow-gauge road from Pittsburgh to Chicago. The managers promise that local aid to the amount of \$3,000 per mile will secure the building of the road.

Chicago, Rockford & Northern.—A bill has been filed in the United States Circuit Court in Chicago to foreclose the second mortgage on this road. The mortgage is for \$150,000, and there is also a first mortgage for \$250,000. The road extends from Rochelle, Ill., to Rockford, 23 miles, and is leased to the Chicago & Iowa; it has no equipment, and it is said that the Receiver of the Chicago & Iowa is about to terminate the existing agreement. The Court made an order for the appointment of a receiver pending the trial of the case.

Cincinnati, Rockport & Southwestern.—At a meeting of the directors held in Indianapolis, Aug. 3, arrangements were made for the completion of the extension of 15 miles from Ferdinand, Ind., to Jasper, by Nov. 1.

Cincinnati Southern.—The special election to decide whether the city of Cincinnati shall issue \$2,000,000 additional bonds for the purpose of completing this road, will be held on Wednesday, Aug. 14.

Danville & New River.—The City Council of Danville, Va., has voted to subscribe \$50,000 to the stock of this projected road.

Des Moines & Western Midland.—A company by this name has been organized to build a railroad from Minburn, Ia., on the Des Moines & Fort Dodge road, westward to Missouri Valley Junction on the Chicago & Northwestern. The distance is about 100 miles and the line about half way between the Northwestern and the Rock Island roads.

Eastern.—This company's car shed in Boston was burned on the night of Aug. 5, with six passenger and two Pullman cars. The loss is \$55,000, and is fully covered by insurance. The fire is believed to have been purposely started.

Eastern, in New Hampshire.—This company has applied to the New Hampshire Legislature for an amendment to its charter, authorizing it to issue bonds to an amount not exceeding that of the stock, and to secure the same by a mortgage on the road.

Grand Trunk.—It is reported from Montreal that President Vanderbilt has offered to carry this company's Chicago business over the Michigan Central on fair terms, giving it the same facilities as are given to the Central's other Eastern connecting lines. The proposed agreement has, it is said, been submitted by General Manager Hickson to the Grand Trunk board of directors.

Greenfield & Creston.—The people of Greenfield, Ia., desire to build a road from that place southward to Creston, about 20 miles, and are trying to secure aid from the Chicago, Burlington & Quincy.

Indianapolis, Bloomington & Western.—Holders of Western Extension bonds are notified that the agreement of reorganization dated July 10, 1877, has been signed by more than the requisite majority and has been declared binding. Those who desire to join in the reorganization must sign the agreement and deposit it with their bonds and the assessment of \$5 on each bond with the Union Trust Company in New York before Sept. 6.

Kansas City, Burlington & Santa Fe.—Surveys are nearly finished for the proposed extension of this road from Burlington, Kan., to Eureka, 47 miles. A line has been found on which the road can be built with maximum grades of 36 feet to the mile and with little heavy work. The survey is to be extended from Eureka west through the Flint Hills.

Kansas Pacific.—Dispatches from Frankfurt, Germany, state that at a meeting held there, representatives of \$2,612,000 Denver Extension bonds were present, and resolved to support the committee in a vigorous prosecution of the foreclosure suit. A considerable amount of bonds from Germany has already been received by the committee, and more are reported on the way.

Kendall & Eldred.—This road is now completed and was formally opened for business July 30. It is 15 miles long and of 3 ft. gauge, extending from Kendall, N. Y., through the valleys of Boyd's and Knapp's creeks to Eldred, Pa., on the Buffalo, New York & Philadelphia road. It runs near the line between New York and Pennsylvania, through a rough and hilly country, and has grades as high as 150 feet to the mile. It is owned chiefly by parties in Buffalo, who are also interested in the Olean, Bradford & Warren road, with which the new road connects. It is built to serve a section of the Bradford oil region, which is fast growing in importance.

Lake Shore & Michigan Southern.—The Detroit *Post and Tribune* of Aug. 6 says: "Attorney-General Kitchner yesterday commenced suit in the Wayne Circuit Court against the Lake Shore & Michigan Southern Railway, to recover a sum claimed to be due the State for taxes. This is in compliance with an act passed by the last Legislature. There has long been a controversy between the railroad company and the State as to the precise amount of special taxes which the former is required to pay. A construction of law is involved. The matter has been in the courts several times, and once in the Supreme Court. Still it has not been settled beyond dispute. The attention of the Legislature having been called to it, that body spent considerable time in discussion, and finally referred the matter to the Auditor-General and the Attorney-General to figure up the amount due, and then collect it by law. Hence the suit. The amount due is all the way from \$50,000 to \$1,000,000, according to the basis on which the calculation is made. To cover all emergencies the suit has been brought for the latter sum."

Maryland & Delaware.—The bondholders, for whose account this road was bought in at the recent foreclosure sale, met in Easton, Md., July 31, and organized the Delaware & Chesapeake Railroad Company. Ex-Gov. Groome, the trustee and purchaser, then formally transferred the road to the new company. The road extends from Clayton, Del., to Oxford, Md., 54 miles, but 10 miles, from Easton to Oxford, have not been worked for some time.

Metropolitan Elevated.—In addition to the first mortgage for \$120,000 per mile, this company has executed and recorded a mortgage to Henry M. Alexandre and Charles G. Francklyn, Trustees, to secure an issue of 7 per cent. second mortgage income bonds to the amount of \$900,000 per mile. This mortgage is a second lien upon the road, equipment and other property of the company, including its half interest in that part of the line which is to be built jointly with the New York Elevated Company; it is dated July 11, 1878.

Minnesota Railroads.—The St. Paul *Pioneer-Press* says: "The time is about up for the railroad companies in Minnesota to pay their annual state tax, nearly all the roads now paying a uniform rate of 3 per cent. upon their annual gross earnings upon the business transacted upon their lines in this state. The reports received by Railroad Commissioner Marshall up to yesterday for the six months ending with June 30, 1878, are as follows, in juxtaposition with which are the gross earnings of the same roads for the corresponding six months of last year, from which a glance can be had of the increase of the railroad business of Minnesota:

	1878.	1877.
St. Paul & Pacific (St. Paul to Sauk Rapids).....	\$194,354.38	\$119,523.24
St. Paul & Pacific, main line.....	343,289.58	172,989.75
Worthington & Sioux Falls.....	44,317.85	6,767.50
Sioux City & St. Paul (St. James to Iowa line).....	178,963.98	111,232.77
St. Paul & Sioux City (St. Paul to St. James).....	284,412.35	206,093.09
	\$1,015,518.14	\$616,616.41

"It will be seen that the business of the two companies above named—the St. Paul & Pacific and the St. Paul & Sioux City—shows the enormous increase of about 66 per cent. during the first six months of 1878 over the same period in 1877. The other roads will doubtless furnish fully as satisfactory an exhibit of their business. The gross receipts of all the roads last year were \$5,408,039—a figure that will probably be swelled to over \$8,000,000 in the year ending with June last."

Montclair & Greenwood Lake.—A majority of the first-mortgage bonds has been deposited with M. K. Jesup & Co., together with the 5 per cent. assessment, as requested by the committee. The committee has thus far reached no basis of agreement with the representatives of the second-mortgage bondholders.

Montreal, Portland & Boston.—Arrangements have finally been made for the crossing of this road over the Stanstead, Shefford & Chambly track, and its connection with the Southeastern road at West Farnham, P. Q. The Central Vermont, which leases the Stanstead, Shefford & Chambly road, has heretofore resisted the crossing, but finally gave its consent, and the track was laid last week.

Mystic Valley.—Grading has been begun on the section of this road between Wilmington, Mass., and the Boston & Maine at North Wilmington. It is said that this part of the road will be finished and worked as a branch of the Boston & Maine.

New Orleans, Mobile & Texas.—The quarantine established by neighboring towns against New Orleans on account of the prevalence of yellow fever in that city, has seriously embarrassed the running of trains on the railroads out of the city. This road has suffered most, as it depends chiefly upon the New Orleans traffic for its business. All through trains, freight and passenger, are suspended, though some local trains are still run. The mail is still carried through on a special car, but no passengers or freight are allowed to go with it.

New York, Lake Erie & Western.—In the New York Supreme Court, Aug. 6, arguments were heard on an application for a *mandamus* to compel the company to carry crude oil from Carrolton, N. Y., to Jersey city. The applicant, Henry C. Ohlen, claims that he offered some 10,000 barrels to the company, offering to pay established rates, but that the oil has been at Carrolton some two months, the company refusing to take it, although it had cars enough. Plaintiff further charges that the company gives a monopoly in oil transportation to Pratt & Co., and will not furnish tank cars for other parties, although Pratt & Co.'s oil is carried below the regular rates. In his behalf it was urged that the company is a common carrier and is bound to carry for all without discrimination, and that it has no right to use its franchises to assist in maintaining a monopoly in certain articles.

Counsel for the company claimed that it had not oil tanks to spare, and that it had a right to exercise a certain judgment with respect to freight and also as to rates to be charged. It was also argued that the right to transportation was a common-law right and could not be enforced by *mandamus*. If plaintiff had been injured his proper remedy was by a suit for damages.

The Court reserved its decision. The case is regarded with much interest, being another attempt of the producers to break the Standard Company's control of the oil business.

Northern Pacific.—Mr. W. Milnor Roberts, Chief Engineer, recently started from New Tacoma, Wash. Ter., with a large party, for the purpose of examining the various lines proposed for this road over the Cascade Mountains, especially that through the Cowlitz Pass. The work will take some time to complete.

North Pacific Coast.—The Saucelito Land & Ferry Company has begun suit to recover possession of a tract of land at New Saucelito, Cal., granted to this company for

depot grounds. The company claims that the railroad has practically removed its terminus to San Quentin, in violation of the contract under which the land at Saucelito was given, and it asks also for damages for breach of contract.

Peoria, Pekin & Jacksonville.—The depot of this road at Forest City, Ill., was struck by lightning on the night of July 31 and totally destroyed, with its contents. The building was insured.

Receiver Allen is now trying to negotiate in New York an issue of Receiver's certificates authorized by the Court.

Pittsburgh & Castle Shannon.—A special meeting of stockholders was held in Pittsburgh Aug. 1, to consider charges made against Mr. M. D. Hays, President of the company. Mr. Hays is also President of the Pittsburgh Southern, and the substance of the charges seems to be that he has considered the interests of that company rather than those of the Castle Shannon. After hearing a report on the condition of the company and the difficulties between the two parties into which the stockholders are divided, the charges were referred to a committee of five, to report at an adjourned meeting.

Pittsburgh & Chicago.—Delegates have been in Pittsburgh soliciting subscriptions for a projected line from Beaver, Pa., westward to Chicago Junction, O., on the Baltimore & Ohio, a distance of about 130 miles. It is proposed to use the new Pittsburgh & Lake Erie road from Beaver to Pittsburgh.

Pittsburgh, Titusville & Buffalo.—This company gives notice that the present earnings do not justify the payment of the coupons due Aug. 1 on the consolidated bonds. Bondholders are asked to fund those coupons, and also the coupons maturing Feb. 1, 1879, in scrip bearing 6 per cent. interest.

The company was formerly the Oil Creek & Allegheny River, and was sold under foreclosure of consolidated mortgage in 1876, the present consolidated bonds (\$1,155,000) being issued in place of the bonds then foreclosed. There are prior mortgage bonds amounting to \$2,580,000, and income bonds amounting to \$315,933. The business of the road has been steadily decreasing for several years.

Rochester, Nunda & Pennsylvania.—It is reported that this road has been sold to the Erie, and that the finished section, from Mount Morris, N. Y., to Nunda, 20 miles, will be worked as a branch of the Buffalo Division. Track was laid on this section several years ago, but it has never been worked. The road was sold under foreclosure in May, 1877, but the purchasers have done nothing with it.

Rutland.—At the annual meeting, held July 31, the stockholders voted to authorize an issue of \$1,500,000 new 5 per cent. 20-years bonds to be secured by a mortgage upon the road. The bonds are to be used to retire the existing first-mortgage bonds, and will then become a first lien on the property.

St. Louis, Alton & Terre Haute.—This company issued the following circular Aug. 1:

"This company regrets to inform the holders of coupons due Aug. 1 on its second-mortgage preferred bonds that, owing to the refusal of the Indianapolis & St. Louis Railroad Company (the lessee of its main line) to pay the rental due, it is unable to meet those coupons promptly. The rental due from the lessees up to this day amounts to over \$150,000, and this company is now taking steps to enforce its rights against its lessees and their guarantors. These latter are well able to meet their obligations, and the company is advised that its rights against them are well defined. It is believed the delay in the payment of the coupons referred to will not be of long duration."

The amount of the second-mortgage preferred bonds is \$1,400,000.

St. Louis & Northwestern.—Seventeen miles of this road in Decatur and Ringgold counties, Iowa, have been located and the grading is under contract, to be finished by Sept. 18. The engineers are now at work on the line northward to Afton, Ia. The road is to extend from Chillicothe, Mo., north by west to Storm Lake, Ia., some 240 miles.

Utica & Black River.—The extension of 10 miles from Morristown, N. Y., to Ogdensburg, was formally opened Aug. 1 by an excursion over the road and an inspection of the new line by the officers and directors of the company.

The buildings in Ogdensburg are substantially finished, and regular trains began to run through between Utica and Ogdensburg on Aug. 5.

Wheeling & Lake Erie.—The petition of this company for a dissolution and the final settlement of its affairs is now before the Court of Common Pleas of Huron County, O., on the question of confirming the referee's report in the case. Opposition to granting the petition is made by some of the creditors and others interested. The company was organized several years ago to build a road from Wheeling, W. Va., to Sandusky, O.; it has 12½ miles of narrow-gauge road finished, from Norwalk, O., to Huron, and some grading done at other points. It has been very unfortunate, having been in trouble financially almost from the time it first began operations.

Worthington & Sioux Falls.—This road was opened for business Aug. 1 to Sioux Falls, Dakota, 63 miles westward from the junction with the Sioux City & St. Paul road at Worthington, Minn., and 15 miles beyond the late terminus at Valley Springs. The road has been built and is controlled in the interest of the St. Paul & Sioux City and Sioux City & St. Paul companies, and is worked as a branch of those roads and under the same management. It is intended to open to settlement a large section of their land grant. Of the 63 miles of the road 48 are in Minnesota and 15 in Dakota.

ANNUAL REPORTS.

Flint & Pere Marquette.

This company owns and works the following lines:

	Miles.
Main Line, Monroe, Mich., to Ludington	253.02
Flint River Branch, Junction to Otter Lake	14.47
St. Clair Branch, Junction to South Saginaw	3.94
Bay City Branch, East Saginaw to Bay City	12.35

Total 283.78

There are 62.25 miles of sidings. On the main line there are 55.48 miles of steel track. The equipment consists of 43 engines; 27 passenger, 4 sleeping and parlor and 11 baggage cars; 297 box, 417 flat and 7 caboose cars; 12 service and 140 hand and push cars. The report is for the year ending Dec. 31, 1877.

The company has a land grant of 511,502 acres, of which 275,729 acres had been sold up to the close of the year. Sales for 1877 were 8,508 acres for \$95,984.91, and timber rights to the amount of \$17,462.85. The amount collected for the year was \$125,300.68, principal and interest on land contracts, and at the close of the year the company held \$358,144.90 in land notes. The expenses of the Land De-

partment were \$16,160.65, and \$49,000 bonds were canceled with funds paid over to the trustees. The whole amount of bonds canceled has been \$1,791,574.97.

The balance sheet is as follows, condensed:

Stock (\$11.622 per mile)	\$3,298,200.00
Bonds (\$24.388 per mile)	6,920,905.50
Land grant sales account	1,487,019.09
Unpaid coupons	933,290.60
Bills payable	775,923.48
Accounts and balances	183,518.90

Total (\$47,920 per mile)	\$13,598,857.57
Construction and property accounts	
(\$32,244 per mile)	\$9,150,184.22
Land grant	3,116,711.46
Profit and loss	1,004,110.29
Bonds and coupons to be canceled	91,734.14
Cash, materials and accounts	296,117.40
	\$13,598,857.57

The passengers and freight carried were as follows:

	1877.	1876.	Increase	P. C.
Passengers carried	489,579	408,439	23,140	5.0
Tons freight carried	347,664	339,767	7,897	2.3

The chief items of freight were 77,103,000 feet lumber; 3,046,400 staves; 193,560,000 shingles; 2,850,000 lath; 61,596 tons other forest products; 43,763 barrels flour; 31,533 tons grain; 15,662 tons other farm products and 97,680 barrels salt.

The earnings for the year were as follows:

	1877.	1876.	Inc. or Dec.	P. C.
Freight	\$552,837.90	\$573,748.05	D. \$20,910.15	3.6
Passengers	386,003.22	360,128.56	L. 19,874.66	5.4
Other sources	30,124.74	60,491.74	D. 1,367.00	2.3

Total	\$969,965.86	\$1,000,368.35	D. \$2,402.49	0.2
Expenses	581,286.06	634,294.06	D. 53,008.00	8.4

Net earnings	\$416,679.80	\$366,074.29	L. \$50,605.51	13.8
Gross earnings per mile	3,516.60	3,525.12	D. 8.43	0.2
Net earnings per mile	1,468.32	1,280.99	L. 178.33	13.8
Per cent. of exps.	58.14	63.40	D. 5.26	8.3

The gross earnings have diminished steadily for five years past, but for the last two years there has been a large reduction in expenses and a gain in net earnings.

The income account, condensed, was as follows:

Cash, materials, etc., Dec. 31, 1876	\$98,567.05
Net earnings	416,679.80
Net receipts from land sales	48,250.00
Property sold, etc.	2,350.00
Bonds sold	67,000.00
Bills payable, accounts, etc.	110,239.58
Total	\$743,086.43

Construction and property accounts	\$15,354.34
Bonds canceled	98,000.00
Trustees for advances	25,282.04
Coupons and interest	365,318.19
Claims adjusted	122.26
State Treasurer, on account of taxes	31,177.39
	535,254.22
Balance, cash, materials, etc., on hand	\$207,832.21

Working expenses for 1877 include 1,281 tons new steel rails and rebuilding both draws in the bridge over Saginaw River. Near the close of the year the grain elevator at Ludington was completed, and for the first time an effort was made to secure a share of the through business east, especially from Milwaukee.

Lafayette, Muncie & Bloomington.

This road extends from Muncie, Ind., west by north through Lafayette to the Illinois State line, 118.2 miles. It is managed by Hon. George H. Chapman as Receiver in suits for the foreclosure of mortgage, and he has made a report for the period from May 14, 1877, to April 30, 1878, being 11½ months. Accounts are kept separately for the Eastern Division, which includes the line from Muncie to Lafayette, 83.2 miles, with 7.2 miles of sidings, and the Western Division, from Lafayette to the Illinois line, 35 miles, with 3.8 miles of sidings.

The equipment owned consists of 10 engines; 6 passenger and 2 baggage cars; 150 box, 30 stock, 73 flat and 8 caboose cars. Three freight engines, 200 box cars in the White Line, 200 in the Great Eastern Line and 100 in the Hoosac Tunnel Line are leased from the United States Rolling Stock Company. The title to two engines, 5 passenger and 2 baggage cars, 50 box and 30 stock cars is still claimed by the vendors.

The report of General Superintendent E. H. Waldron gives the following statistics of traffic:

	East Div.	West Div.	Total.
Train mileage	60,022	60,307	120,329
Passenger	90,283	26,646	116,929
Freight	49,348	32,170	81,518
Service and switching			

Total	200,253	128,123	328,376
Average per engine	11,125	7,117	

Mileage of loaded freight cars	859,267	323,039	1,182,306
Av. tons per loaded car	7,757	9,680	

Passengers carried	45,844	32,343	78,087
Passenger mileage	871,157	612,165	1,483,322
Tons freight carried	142,227	95,457	237,684
Tonnage mileage	6,065,081	3,127,017	9,192,098

Average train load:			
Passengers, number	14.37	8.83	
Freight, tons	73.82	117.35	

Earn. per pass. train mile	74.95 cts.	30.00 cts.	
Earn. per ft. train mile	113.33 "	273.00 "	
Earn. per pass. per mile	3.39 "	3.49 "	
Earn. per ton per mile	1.60 "	2.20 "	
Expense "	1.20 "	1.55 "	

Grain furnished 103,058 tons of the freight on the Eastern, and 75,044 tons on the Western Division. The earnings for the year were as follows:

	East Div.	West Div.	Total.
Freight	\$106,633.65	\$56,901.42	\$163,535.07
Passengers	29,181.64	21,272.39	50,454.03
Mail and express	7,494.59	3,273.31	10,767.90
Other sources	4,187.72	16,918.93	21,106.65

Total	\$147,497.60	\$98,396.05	\$245,893.65
Expenses	109,725.68	60,118.51	178,844.19

Net earnings	\$37,771.92	\$29,247.54	\$67,019.46
Gross earn. per mile	1,772.81	2,810.46	2,080.06
Net	453.90	835.64	567.00
Per cent. of exps.	74.39	70.27	72.74

The Auditor's statement of the Receiver's assets and liabilities at the close of the year is as follows:

Construction, additions during year	\$28,545.09
Equipment	913.05
Supplies on hand	7,038.09
Accounts and balances due	53,667.04
Paid on account L. M. & B. R. R. Co., less amount received as dues to that Co.	20,639.87
Cash	14,983.76

Total	\$113,806.00
Accounts and balances payable	\$46,787.44
Surplus, East Div.	47,771.92
West Div.	20,247.54
	113,806.90

There were \$45,000 Receiver's certificates issued for in-

debtedness of the Lafayette, Muncie & Bloomington Company, of which \$29,505.74 are charged to the Eastern, and \$15,494.26 to the Western Division. The floating debt of the company still outstanding is estimated at \$100,000, of which about \$60,000 is for equipment.

The business of the road was almost entirely suspended when the Receiver took possession, and the revenues for the first two months were very small. The Eastern Division was still in an unfinished condition, and the Western Division so badly depreciated that it was hardly safe to run trains over. The Receiver has laid 9¼ miles steel and 2¼ miles iron rails, and 20,728 new ties, the rails being all on the Western Division, where the track had been several years in use. A large amount has been expended in bridge repairs, and much more is needed. A large part of the line has been fenced.

The local business of the Eastern Division is hardly developed as yet, and much of the business is through freight, taken at low rates in competition with other lines.

Lafayette, Bloomington & Mississippi.

This company owns a line from Bloomington, Ill., east to the Indiana line, 81 miles. It is an extension of the Lafayette, Muncie & Bloomington, and was at first operated by the Wabash. In May, 1876, the present company acquired possession through a foreclosure sale, but the road was leased to the Lafayette, Muncie & Bloomington, until May, 1877, when the company resumed possession. The present report covers the year ending April 30, 1878, and is the first made by the company.

There is no equipment owned, passenger equipment being leased on a mileage basis from the Receiver of the Lafayette, Muncie & Bloomington, while three freight engines and 325 box cars are leased from the United States Rolling Stock Company.

The general account is as follows:

Stock (\$4.938 per mile)	\$400,000.00
Bonds (\$18.765 per mile)	1,520,000.00
Accounts and balances	24,951.18
Surplus	46,641.17

Total (\$24.488 per mile)	\$1,991,592.35
Construction (\$23,750 per mile)	\$1,923,724.87
Cash, supplies, balances due	67,867.48
	1,991,592.35

The work done for the year was as follows:

Train mileage, passenger	95,619
" " freight	59,974
" " service and switching	9,178

Total	164,771
Passengers carried	67,012
Tons freight carried	91,953

Mileage of loaded freight cars	396,700
Gross earn. per passenger train mile	58.90 cts.
Net	8.57 "

Gross earn. per passenger per mile	0.48 "
Net	0.24 "
Gross earn. per ton per mile	2.40 "
Net	0.82 "

Average mileage per engine was 9,132 miles. Of the passengers carried 2,870 were through and 64,142 local. Of the freight, 83,047 tons were east-bound and 8,506 tons west-bound; 62,688 tons were grain. The average tonnage to each loaded car was 10½ tons. The earnings for the year were as follows:

Freight	\$98,790.76
Passengers	50,002.51
Express, mail, etc.	7,465.74

Gross earnings (\$1,927.73 per mile)	\$1,556,229.01
Expenses (70.15 per cent.)	109,587.84

Net earnings (\$575.82 per mile)	\$46,641.17
New construction	3,724.87

Surplus	\$42,916.30
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The rental paid for freight cars was 0½ cent per mile run; mileage made on connecting lines was paid directly to the United States Rolling Stock Company, and does not appear in the accounts above. Construction expenses were for necessary buildings, round-house, turn-table, etc., and new sidings.

During the year 1,270 feet of new sidings were laid; 10,115 new ties and 21 tons iron were laid. The iron in the track is little worn, and light renewals will be sufficient for a time, but a careful estimate shows that 43,394 ties need to be replaced, which is being done as fast as possible.

The company having received no books or accounts from the former management, no comparisons can be made. When the change of management took place, May 1, 1877, all traffic was suspended for four days, and at least two months were required to get the business of the road properly adjusted. Business was also suspended for a week during the July strikes. These troubles, with the mild winter and bad roads, explain the light earnings of the road for the year.

Rutland.

This company owns a line from Bellows Falls, Vt., north-west through Rutland to Burlington, 120 miles; it leases the Addison Railroad from Leicester Junction to Ticonderoga, 16 miles. The whole property is leased to the Central Vermont, and the report for the year ending June 30, 1878, presented at the recent annual meeting, relates only to the financial affairs of the company.

The general account is as follows:

Preferred stock	\$4,000,000
Common stock	2,480,600

Total stock (\$54.005 per mile)	\$6,480,600
Bonds (\$20,833 per mile)	2,500,000
Dividend scrip outstanding	217,392
Coupons unclaimed	3,257
Bills payable	363,228

Total (\$79,704 per mile)	\$9,564,477
Road and real estate (\$74,845 per mile)	\$8,981,414
Addition R. R. securities	339,500
Bonds on hand	230,700
Cash and rental due	12,863
	\$9,564,477

During the year the amount of preferred stock outstanding was decreased by \$143,500. The income account was as follows:	
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Cash on hand from previous year	\$2,877
Rental of roads	306,000
Rents of real estate	554
Interest on receivables	13,294

Total	\$322,725
Coupons	\$181,040
Interest	37,976
Rental, Addison road	70,990
Salaries and miscellaneous	16,167
Taxes for 1875, 1876 and 1877	15,219
	321,362

Balance at close of year	\$1,363
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The rental of the road was punctually paid as it became due.